Scientific American.

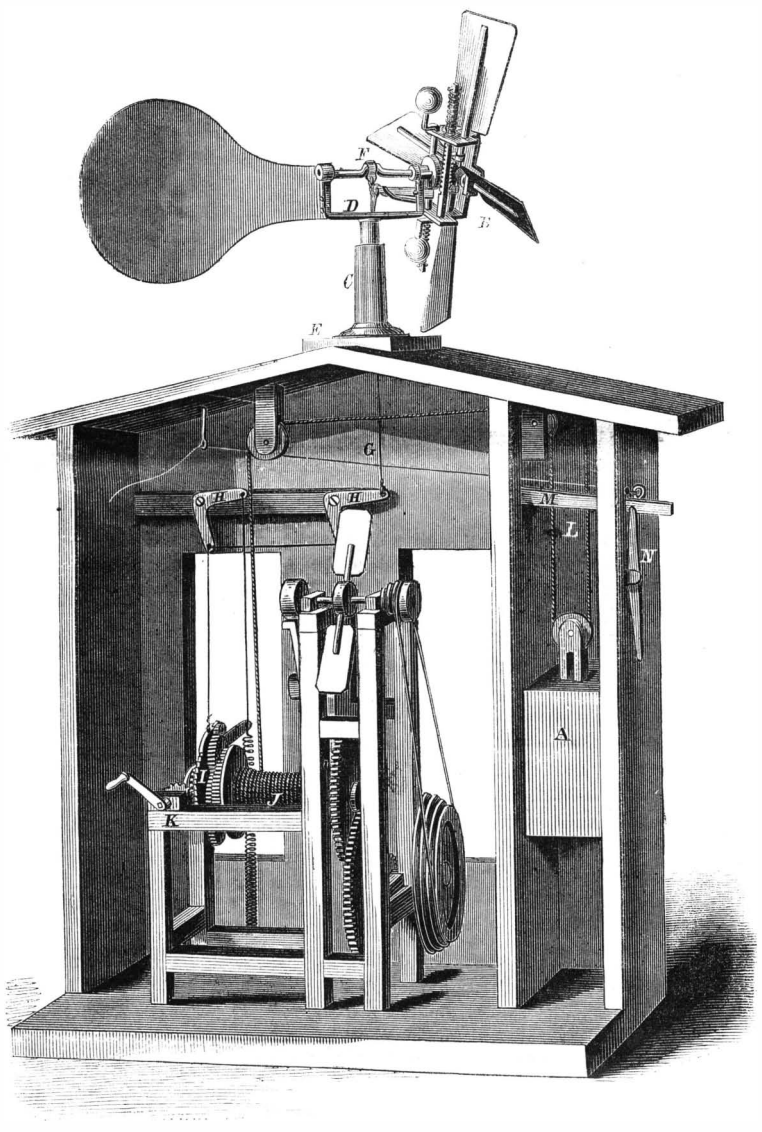
A WEEKLY JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, CHEMISTRY AND MANUFACTURES.

Vol. XI.---No. 13. (NEW SERIES.) NEW YORK, SEPTEMBER 24, 1864. $3 PER ANNUM (IN ADVANCE.)

Improved Power Accumulator.

We illustrate herewith a novel and ingenious power for light work, either for farmers or mechanics who run but few and simple machines. Appended is the inventor's description of his machine :—

"The peculiar novelty of the machine consists in its accumulating and self-acting mechanism together with portability and compactness; by means of which a cheap and reliable power may be obtained from the wind. The machine is so arranged by means of the accumulating apparatus that a steady power is obtained when there is no wind, the said power being obtained from the weight, A, which is raised when the wind blows by means of the small, portable and self-regulating wind-wheel, B. This wheel consists simply of an upright hollow post or tube, C, which forms a support for the wheel frame, D, npon which it turns freely; the bottom of this post is provided with a base, E, by which it is readily fastened in any convenient position upon the top of a building by means of bolts or screws. From the crank, F, of this wind-wheel a wire, G, connects with the vibrating lever, H, of the power-machine. This latter sets in any desired position in the building beneath, and is kept in motion, whenever the wind blows, by the lever, which turns a ratchet wheel, I, by means of a dog or pawl. This ratchet wheel revolves the power drum, J, by a system of gears which is peculiarly arranged. As the drum turns it coils up the rope which is connected to the weight and raises the same, and thus the weight will continue to be raised until at the top of its movement, when it strikes a lever, N, and automatically disconnects the power apparatus from the wind-wheel. The weight now being at the top of its movement it remains stationary until the power-machine is started, when it begins to descend giving out its power, which is the case when there is no wind, and the wind-wheel inoperative; but when the wind-wheel is running and also the power-machine, then the weight remains nearly stationary, acting in the case as a reservoir of power, receiving it from the wind-wheel at a varied velocity and giving it out true and uniform. The whole arrangement is easily fitted up in any building, occupies but little room, the power-machine being only about two feet square and four feet high, is self-operative and requires no more care to run it than to throw off the friction brake when it is desired to run and throw it on again when desired to stop. This accumulating wind-power is designed especially for the farmer, the dairyman, or for household purposes, such as driving churns, washing machines and other light machinery. The power of this machine is not limited, depending, as it does, very much upon the size of the wind-wheel—the power apparatus—amount of weight used, and the length of its fall. Appended are some of the advantages claimed for this invention.



SMITH'S POWER ACCUMULATOR.

"The manner of connecting the wind-wheel with the power apparatus by means of a single wire, forms a cheap connection, and is readily fitted up by any person of ordinary capacity. The compactness of the power-machine is such that it occupies but little room in a building, and it is also self-operating, so that a cheap power is obtained requiring little care or attention to use it, and keep it in order. As the weight moves between the walls of a room it occupies no room available for other uses; and there is further a crank and bevel gear, K, by which the weight may be wound up by hand when desired."

This machine is entirely self-acting, so that even if the weight should run up to the top while the attendant is away, it will be thrown out of gear with the hoisting arrangement and impart its inertia to the work to be done. This governor, as we may call it, is shown at L; as the weight rises it strikes the lever, M, and detaches it from the one at N, in connection with it. Patent now pending through the Scientific American Patent Agency, by Robert L. Smith, of Stockport, N. Y. ; for further information address the inventor at that place.

Trial of Ames's Wrought-iron Gun.

The preliminary trial of the "Ames" wrought-iron rifled cannon, named the *Union* was made at Bridgeport, Conn. The site selected is about one and a half miles from the railroad depot, directly on the shore of Long Island Sound. A vessel had been chartered to measure by log and soundings a distance of five miles directly off from the shore. When the distance was reacned a signal was given, and the gun was fired at an elevation of about 20°, with a sixteen-pound charge and one of Hotchkiss's 150-pound shells, which passed beyond the vessel at least half a mile, throwing up a volume of water to a considerable hight. The vessel was then anchored, the shore being six miles and the light-boat four miles distant. The shell was fired with a charge of 25 lbs. of powder, the elevation of the gun being increased to 24½°. The flight of the shell occupied thirty seconds, and fell considerably more than a mile beyond the vessel. The recoil of the gun at the last discharge was a trifle over two feet. The manufacturer has orders from the Government for fifteen of these guns, which he will be able to deliver at the rate of one in every ten days. The gun is constructed on an entirely new principle, consisting of successive layers of wrought-iron rings compactly welded into a solid mass. The inventor is of opinion that the charge of powder may be increased to thirty pounds, so as to gain a still greater range. So far as this partial trial affords evidence, the "Ames" gun exceeds in range all American guns by about two miles.—*Exchange.*

PRESERVATION OF WOOD.—The following method is used in Germany for the preservation of wood. Mix 40 parts of chalk, 50 of rosin, 4 of linseed oil, melting them together in an iron pot; then add one part of native oxide of copper, and afterward, with care, 1 part of sulphuric acid. The mixture is applied while hot to the wood by means of a brush. When dry it orms a varnish as hard as stone.

AT Plymouth, England, the price of illuminating gas is three shillings (73 cents) per 1,000 feet.

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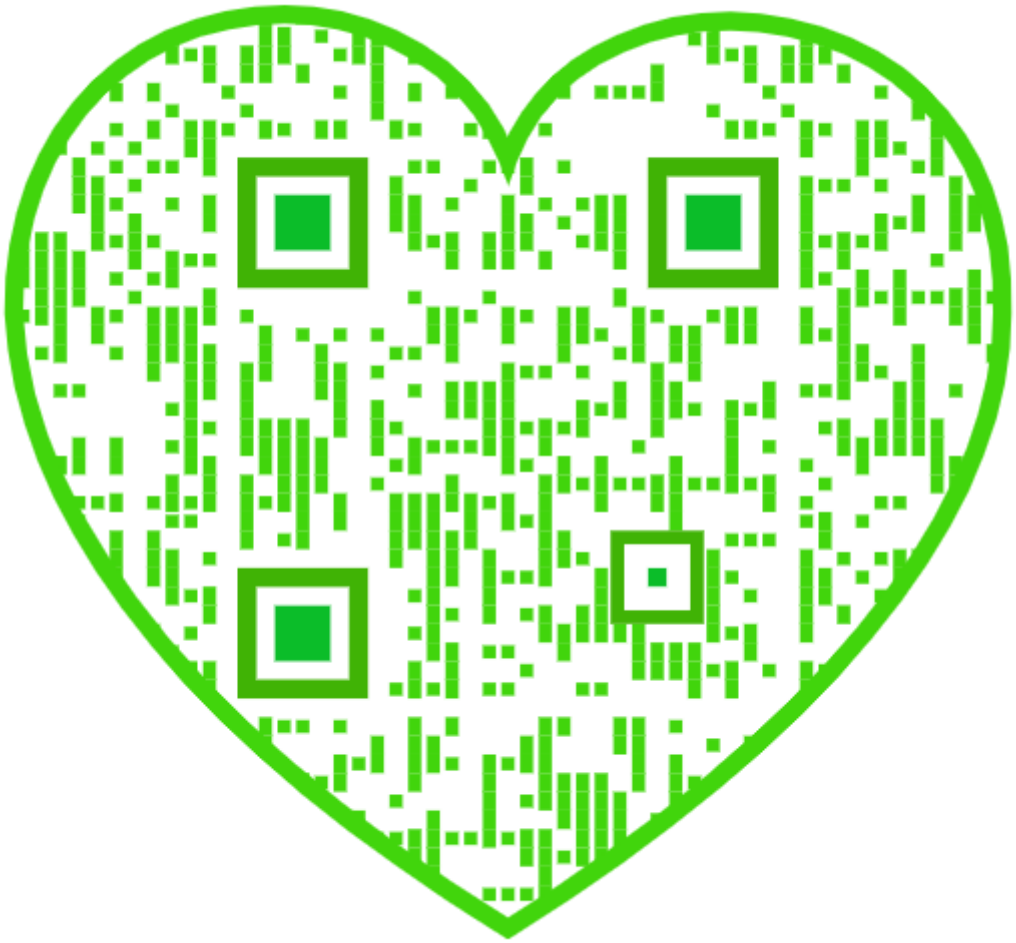

HOW THE RUSSIANS REGARD THE MONITORS.

While the leading press of this country is doing all it can to destroy public confidence in our iron-clad navy, foreigners have the sagacity to copy them, and Russia is now building several from our models. It is possible the Russians are entirely ignorant of the nature of their undertaking, and that our astute daily journals could teach them a thing or two on this point, but the fact is all the same—the vessels have found more favor abroad than at home, and this in spite of the wholesale denunciation and abuse showered upon them from all sides. No journal but the SCIENTIFIC AMERICAN has had the discrimination to appreciate their good points; and what we have said about them is fully borne out by their performances. The *British Army and Navy Gazette* says:—

The opinion of the Russian Admiral Lissoffsky on the monitor system of the United States forms an important article in a semi-official publication of St, Petersburg that is always devoted to these matters. It will be seen that the original faults of these vessels were observed by the Russian officer, who was purposely sent to America for the purpose of reporting to his own government on the subject. The reports of the Admiral and captains of the American iron-clad squadron of the bombardment of Charleston have offered a new occasion for expressing different opinions as to what system of iron-clad shipbuilding generally preference is to be given, and what system is best suited to our navy. Supposing that these opinions (founded upon a special knowledge of the subject) will assist in clearing up this important and entirely new thing, especially in Russia, we present below an article on this subject; which, by its clearness and general accessibility, will probably attract attention, even of those who, not belonging to the naval profession, are interested in the question of marine defenses adopted in Russia.

The principal problems which had to be solved in armor-plated shipbuilding were the following:—

First—The protection of vessels as much as possible from the danger of fire and sinking; wooden vessels being inevitably exposed to that from the destructive nature of the artillery of the present time; and—

Second—The preservation of the lives of the crew from the terrible effects of firing, the common wooden vessels generally in use not offering that protection at all.

The affair at Charleston demonstrated that both of these problems were most successfully solved by the monitors. They came out of a terrible and unprecedented fire without a hole in any part of the vessels under water; their entire loss of men was confined to one man killed and a few wounded. The losses and injuries sustained by them were of such a nature as could be easily guarded against in future, and there was no necessity to take them into dock, as the repairs were all done in Port Royal, one of the most insignificant ports in North America.

THE MONITORS IN RUSSIA.

"In Russia the Navy Department, in the person of his highness the General Admiral and his nearest assistants did not cease to follow from the beginning the trials of armored shipbuilding in other states, but with prudent caution it was decided not to do anything until the new vessels had been sufficiently tested. In consequence, after the first battle between iron-clad vessels in America, the Navy Department immediately sent out there several officers belonging to different branches of the naval service, to study those new vessels on the spot. Those persons fulfilled the commission with which they were charged in the most successful manner. Their reports confirmed the Navy Department in its conclusions that out of all known systems of iron-clads the monitor was preferred for our coast defenses, especially in our shallow waters. The protection of Cronstadt, our principal naval port, an object of constant and particular solicitude of our Navy Department, presents besides such local conveniences for the use of those vessels as cannot be found everywhere. In consequence of all this several vessels were commenced on the exact model of the American monitors. These vessels, destined exclusively for the protection of Cronstadt, rapidly and successfully move to completion. All the improvements, the necessity of which has been proved by experience in America, will be introduced in our vessels, and it is expected that those vessels will be a very effective and necessary addition to our land defenses of Cronstadt.

"In examining the reports of the captains of the monitors which participated in the bombardment of Fort Sumter, knowing exactly the kind of battle the monitors were engaged in, the injuries received by them, and remembering that notwithstanding a severe concentrated fire from the numerous Southern forts, the Federal fleet had only one man killed and two wounded, we come inevitably to the conclusion that the attack on Charleston positively proves the monitors capable to compete, and probably with chances of success with stone fortifications.

"Notwithstanding the defects of the American monitors, the strength shown by them during the bombardment is truly astonishing. The Southerners were firing from guns of the heaviest caliber at distances which probably were carefully measured before the commencement of the action; these distances being smaller than half the distance of an ordinary pointing fire, and yet not one of the monster charges penetrated the turrets; the strongest experience of this kind was sustained by the *Passaic*; and what was the result? A shot from a gun of a heavy caliber struck the upper edge of the turret, broke eleven plates, but did not penetrate the turret, though the strength of the shock was such that the projectile rebounding upward made an indentation of two and a half inches in the pilot-house, and bent it on one side; and notwithstanding all this, in the turret proper of the *Passaic*, as well as in the turrets of the other monitors, there was no one killed or wounded—a result certainly very important and which confirms the great superiority of the monitor system over all other systems of armor-plated vessels.

"The fighting test through which the monitors have passed is certainly more effectual and decisive than the experiments made on plates representing the sides of a *Warrior* or a *La Gloire*; four and one-half-inch plates of those were fractured by occasional shots.

"We may well ask, what would have become of the vessels covered by such plates, and their sides presenting a larger target, and if (as it happened with the *Nahant*) they should be exposed for some time to a concentrated fire of one hundred guns, at a distance less than one thousand five hundred feet? It is not difficult to answer. Not only the *Warrior*, with *La Gloire*, but all those *Minotaurs*, *Northumberlands*, *Magentas* and *Solferinos*, constructed on improved models, would be sunk in such circumstances; while the *Nahant* got out of the action with injuries comparatively not very important."

The Rice-paper of Formosa.

BY ROBERT SWINHOE, H. M. CONSUL AT FORMOSA.

The plant that perhaps produces the so-called rice-paper is the *Aralia papyrifera* of botanists, a low shrub with large leaves, in form not unlike those of the castor-oil plant (*Ricinus communis*). This plant has as yet only been produced from the northern end of Formosa, where it grows wild in great abundance on the hills. It is of very quick growth, and the trunk and branches, which are lopped for use, are not unlike those of an elder in appearance. The cellular tissue or pith attains its full size the first year. The trunks and branches are mostly procured from the aborigines of the inner mountains, in barter for Chinese produce. They are rarely straight throughout their length, and are usually cut into pieces of about nine inches long, and with a straight stick inserted at one end and hammered on the ground, the pith is forced out with a jump at the other end. The pith is then inserted into straight hollow bamboos, where it swells and dries straight. If too short to form the required breadth of paper, several bits are inserted into a hollow bamboo, and, by rods inserted at both ends of the bamboo, pressed together until dry. By this process the short bits are forced to adhere together and form one straight long piece of the required length. Thus paper of almost any size can be procured. The knife used in paring the pith into paper is in shape not unlike a butcher's chopper. It is well sharpened on a stone, and, when not used, kept with the edge in a wooden groove held firm to it by two strings round the wood and the knife. Before using it, the edge receives a fresh touch-up on a small block of wood, usually a piece of the timber of *Machilus ramosa*, shaped like a large bone. The block on which the pith is cut consists of a smooth brick or burnt-clay tile, with a narrow piece of brass on the rim of paper pasted at each edge, on which the knife is laid, and is consequently a little raised above the bare tile itself. The block is laid flat on a table, and the dried pith rolled on it with the fingers of the left hand, and then the knife laid on the brass rims with its edge toward the pith, its handle being held by the right hand. As the knife is advanced leftwards by the right hand, the pith is rolled in the same direction, but more slowly, by the fingers of the left. The paring thus goes on continuously, until the inner pith, about a quarter of an inch in diameter, is left, resembling somewhat the vertebral column of a very small shark, and breaking into similar concave-sided joints. This is used by the Chinese as an aperient medicine. The paring produces a smooth continuous scroll about four feet long, the first six inches of which are transversely grooved and cut off as useless. The rest shows a fine white sheet. The sheets, as they are cut, are placed one upon another and pressed for some time, and then cut into squares of the required size. The small squares made here are usually dyed different colors, and manufactured into artificial flowers for the adornment of the hair of the native ladies; and very excellent imitations of flowers they make. The sheets most usually offered for sale, plain and undyed, are about three inches and a quarter square, and are sold in packets of one hundred each, at rather less than one penny the packet, or a bundle of five packets for fourpence. The larger-sized paper is made to order, and is usually exported to Canton, whence the grotesque but richly-tinted rice-paper paintings have long attracted the curiosity of Europeans. Some of us tried our hands at paring, but made most abortive attempts, producing only chips, though the operation looked so easy in the hands of the apprentice.

Extraction of Gold by Chloration, etc.

This process is founded upon the convertibility of gold into a chloride by the agency of chlorine gas, and the solubility of this chloride in water. The pulverized and wasted ore, which contains the gold in its metallic state, is put moist into vessels with perforated false bottoms, under which chlorine gas, carefully freed by washing from any admixture of hydrochloric acid, is introduced. Percolating upwards through the ore, the gas converts the gold into chloride of gold. As soon as the free chlorine begins to escape above, the supply of gold is stopped, and the soluble chloride of gold extracted by leaching the ore with warm water. The solution is then collected in suitable vessels, and the gold—after the free chlorine yet remaining has been expelled by heat—is precipitated, either in the form of a sulphuret by means of sulphuretted hydrogen, or in the metallic state (as a brown powder) by the addition of sulphate of the peroxide of iron. Instead of chlorine gas, water previously saturated therewith, or an acidulated solution of chloride of lime, may be employed. This process admits of a complete extraction of gold, if the character of the ore favors its application. From a pecuniary point of view, its applicability depends greatly upon local conditions. The presence of large quantities of baser metals in the ore, especially copper (which is the case in Colorado ores), causes great waste of the expensive chlorine gas; since all the copper must be converted into chloride before the gold can be secured.

The ingredients used for the production of chlorine are sulphuric acid, black oxide of manganese and salt, or hydrochloric acid and manganese. When these materials can be cheaply obtained, this process would undoubtedly be profitable for silicious ores, *i. e.*, ores containing too much base metal. At Reichenstein, in Silesia, refuse ores, yielding but ten to twenty grains to the hundred weight, have indeed been treated advantageously by this process. But its adoption in our western territories—even if the character of their ores were more favorable to it—would present a widely different economical question. It may be asked, why not manufacture the regular sulphuric acid on the spot in connection with the roasting of the ores, whereby an abundance of sulphurous vapors are produced, from which, by higher oxidation, sulphuric acid is formed? In a well-settled country, where metallurgy was an established profession, it

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would indeed be considered folly to desulphurize pyritic ores, and not turn the sulphuric vapors to account in the manufacture of sulphuric acid; but it would be equal folly to attempt such a thing at this early day in the territory of Colorado. If the costliness of leaden chambers and other necessary apparatus, and the great scarcity of capable workmen, be taken into account, the success of such an undertaking appears problematical.

These economical conditions are sufficiently unfavorable to discourage metallurgists from introducing the process of chloration in Colorado; but the gravest objection to its use is the inevitable sacrifice of health and life entailed upon those who engage in it. It will be practically impossible to protect the workmen in any extended operations under this process from the poisonous effect which is produced in the human system by the inhalation of chlorine gas.

Drilled v. Punched Plates.

This article was handed in for insertion some weeks ago, but escaped the printer's attention. Although late it is still seasonable, and will prove interesting:—

"Probably the liveliest discussion which arose upon the several papers read at the meeting of the Mechanical Engineers at Glasgow turned upon the comparative advantages of punching and drilling in making rivet holes. Mr. Fletcher, the veteran tool maker (and a partner in the house of Messrs. Wm. Collier & Co.), had prepared a very able paper, in the course of which he properly gave the preference to drilled as compared with punched rivet holes. He described the defects of ordinary punching, not perhaps with especial originality, inasmuch as these defects are so well known, and have been so often discussed, that little that is new could be said of them. The process of punching is a rough, and we may say a barbarous, mode of making a hole in an iron plate. A series of holes, too, in a row, can hardly be punched with that degree of accuracy which is necessary in modern boiler making and bridge building. We are here speaking only of accuracy of line and pitch, for no punched hole is in itself cylindrical or smooth. Mr. Roberts' jacquard punching machine secured, it must be owned, a degree of accuracy before unknown in punching bridge plates, and it was employed with success for punching the plates of the Conway, the Victoria, the Boyne, and the Jumna bridges, and, more recently, upon the Menangle and Penrith bridges for the Great Southern Railway of New South Wales. But admirable as is the ingenuity displayed in the jacquard machine (and that now at the Canada Works, Birkenhead, is the only one which the late Mr. Roberts ever made), it must be owned that it would have accomplished even better work had it been a drilling instead of a punching machine. Besides, whatever want of truth and accuracy there may be in ordinary punching, it is believed that the action of the punch strains, and thus weakens the iron. Few, we think, employ punches which exactly fit their dies, and therefore the operation of punching does not give the clean shearing cut which is commonly counted upon. An examination of a plate which has only been half punched through will at once show how much the punch distorts, and therefore, of necessity, strains the iron upon which it acts. No iron can be once strained beyond its limit of elasticity without injury, or, in other words, without being made weaker ever afterwards. Yet an ordinary punch does strain the iron surrounding the punched hole, and to an extent which Mr. Fairbairn has estimated pretty closely from the results of experiments upon punched plates. Although with 11-16-inch rivet holes of $1\frac{3}{4}$-inch pitch less than 40 per cent of the iron is removed by punching, the single riveted joint loses at least 44 per cent of the strength of the solid plate. This, too, is the result, notwithstanding the friction at the lap of the plates, which thus gives each plate a certain hold upon the other. We believe Mr. Fairbairn's experiments showed a loss of strength in the iron left between the holes punched in a row equal to about 15 per cent of the strength of the same nett section of iron before punching. With very thick plates the injury by punching is greater, we believe, than with thin plates. The French engineers prefer very thick iron for large locomotive boilers, and for those, 5 feet in diameter, of the largest Engerth engines, iron of 15 millimeters, or 6-10 inch thickness, is employed. Here we believe the loss of strength by punching amounts to something considerable, and we can say that, in some of the French bridge work, we have seen three consecutive rivet holes cracked out to the edge of the plate under the combined action of punching and riveting. A series of experiments, made by a committee of Lloyd's, with reference to the strength of the riveted plating of iron ships, went to show that a joint in 3-8 inch iron was absolutely as strong as one in $\frac{1}{2}$-inch iron, the loss of the whole strength, due to riveting, being only 40 per cent in the first case, and nearly 60 per cent in the second. If, instead of trusting to general opinions, engineers chose to investigate by actual experiment the effect of punching upon the strength of iron plates, they would, we believe, have reason to abandon punching to a great extent, if not altogether. The drill makes a clean cut, without the chance of injury to the iron, and in this way its employment must add greatly to the strength of riveted structures, and this extra strength is quite irrespective of the additional strength obtained by the certainty that the rivets exactly fit the rivet holes, and that the holes are exactly coincident in opposite plates without the use of the drifting tool. Rivet holes are now drilled with nearly the rapidity with which they can be punched. Mr. Fletcher, at the Glasgow meeting, described a machine upon the general construction adopted a few years ago by Messrs. Cochrane for drilling the plates of the Charing Cross bridge, and he mentioned the fact that this machine drilled all the holes in a large plate of 1-inch thickness in fourteen or fifteen minutes only, all being drilled at one operation. By powerful hydraulic pressure, worked from an accumulator, each drill is pressed with a force of about 6 cwt.; but by increasing the pressure the whole plate may be drilled in the short space of three and a half minutes. Mr. Adamson, the eminent boiler maker, of Hyde, stated that he found the drilled plates much better, in respect of strength and tightness of the joints, than those punched in the ordinary manner, and he anticipated that, within a year or so from the present time, every boiler plate worked up in his factory would be drilled instead of being punched. With a far-seeing judgment of the requirements of an improved practice, Mr. Adamson added that he had still greater confidence in welded seams; and we may conclude that this grand improvement, occasionally resorted to by Bury, Hackworth, and others, will eventually come into general use in the case of boilers made of plate iron.

"There were those, however, at the Glasgow meeting, who contended stoutly that drilled rivet holes were in no respect superior to those punched in the ordinary manner. We are unwilling to refer personally to the speakers who supported this view, but they had no facts whatever in support of their assertions upon this point, beyond the negative proof that boilers made with punched holes had not yet blown up, nor bridges, with holes thus punched, yet broken down. This argument, however it may commend itself to a certain class of practical men, is not that upon which the question is to be discussed. No one pretends that bridges are in danger of breaking down merely because their rivet holes are punched, are therefore no question of this kind is at issue. The only question is, do punched holes leave as much strength, and are they as consistent with tightness and general excellence of workmanship, as those drilled with the improved machinery? It is no proof because a bridge has not broken that it is as strong as it might be made with the same materials. The necessity for the utmost strength, both of the materials and of their combination in bridges, boilers, and ships, is now more widely recognized and insisted upon than heretofore. Not only are we building numerous bridges of great span, but the weight of railway trains is increasing, not merely when taken collectively, but when weighed over each foot of line covered. So with boilers; while the old sizes are still retained, there is a tendency to increased pressures; and in the case of iron ships, no amount of strength consistent with lightness is too great. We shall have an additional guarantee of safety when all riveted work, to which the security of human life is confided, is carefully drilled instead of being punched, and yet we have to confess to a wonder that the representatives of great houses should, both at Glasgow and at the late meeting of the South Wales Engineers, contend that punched plates were as strong as, if not stronger than, those drilled by special machinery."—*Engineer.*

Mechanics' Club House.

An artisan's club house, which has been built upon the co-operative principle, chiefly by the men employed at the foundries and engine shops about Birmingham Heath and Smethwick, was lately opened in that locality. The club begins with a weekly subscription of 3d., and a quarterly one of 2s. 6d. Quarterly members alone will have the right of voting, and one bagatelle table will be reserved exclusively for their use. The club will be open, to members only, every day (Sundays excepted) from eight o'clock in the morning until ten o'clock in the evening, and to its members the following advantages are offered:—Spacious, well-ventilated, and lighted rooms, for smoking, reading, bagatelle, chess, draughts, dominoes, etc., etc.; refreshments, of the first quality, at very reasonable prices; a reading-room, supplied with London and local papers, magazines, etc.; a library of standard and interesting works of fiction, history, biography, etc.; a lavatory, fitted up with every convenience; free attendance at lectures, reading, and classes, which will be organized at intervals during the year. There is also attached to the premises a gymnasium, with swings, jumping bar, climbing poles, etc.; an excellent quoit ground and skittle alley, in connection with which it is intended to establish clubs; and a capital rifle gallery. There will be classes for the study of advanced arithmetic, practical mechanics, and general and mechanical drawing, with English literature and composition. The committee are anxious to commence a glee and madrigal class.

Iron Bridge Across the Schuylkill River.

The Philadelphia *Railway and Mining Register* states that the connecting railway bridge will cross the Schuylkill river a little west of Girard avenue bridge, where there are bold, high bluffs of bare rock on either side of the channel. The piers will rest on foundations laid on solid rock. The work is progressing. An iron section of 207 feet span will arch the channel of the river. To this iron section which is being built in the Altoona shops of the Pennsylvania Railroad Co., the road will be carried on massive brick arches of sixty feet span. The track will be about seventy feet above the surface of the Schuylkill river, and it will rest on a bridge over the carriage way and sidewalks of Girard avenue. In fact, from its forked junction with the Pennsylvania Railroad, the connecting railroad is located at an elevation which will carry its track over the intersecting rail and carriage roads on either side of the Schuylkill river, thereby rendering collision impossible at such intersections, at the same time securing an important object without risk to the public.

The Artesian Well of Grenelle, at Paris.

The boring of this well by the Messrs. Mulot occupied seven years, one month, twenty-six days, to the depth of 1,794$\frac{1}{2}$ English feet, or 194$\frac{1}{2}$ feet below the depth at which M. Elie de Beaumont foretold that water would be found. The sound, or borer, weighed 20,000 lb., and was treble the hight of that of the dome of the Hospital des Invalides, at Paris. In May, 1837, when the bore had reached 1,246 feet 8 inches, the great chisel and 262 feet of rods fell to the bottom; and, although these weighed five tuns, M. Mulot tapped a screw on the head of the rods, and thus connecting another length to them after fifteen months' labor, drew up the chisel! On another occasion, this chisel having been raised with great force, sunk at one stroke 85 feet 3 inches into the chalk!

MAKING OASES.—Mr. Martins, in an address at one of the *Soirees scientifiques* of the Sorbonne, gives a glowing account of the effect over the African desert, through French enterprise, in sinking artesian wells. He predicts the time when immense lines of railways shall run from the Mediterranean to Senegal, and from Senegal to the Red Sea; and when Suez, with its finished canal, shall become "the center of relations with fruitful Africa, the port of all seas, the route of all continents."—*Cosmos.*

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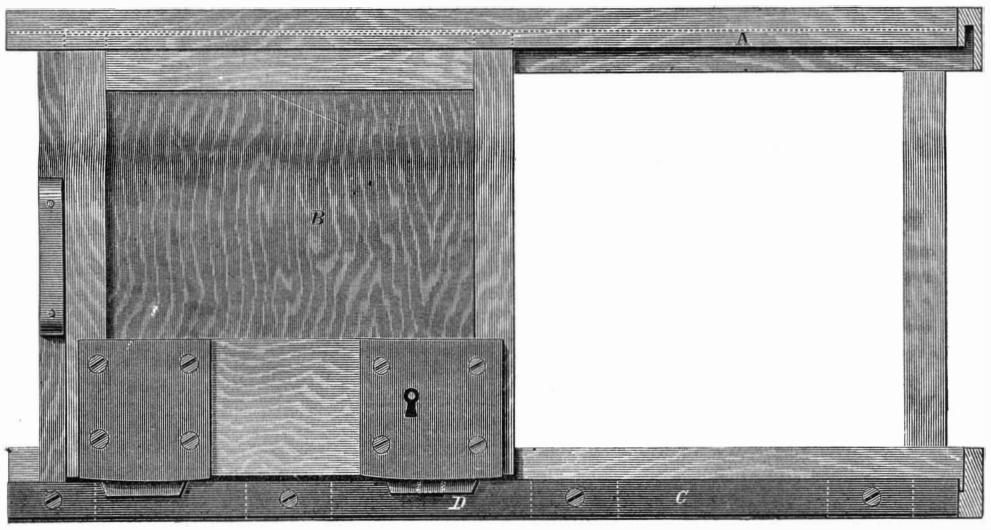
Improved Car Lock.

This invention furnishes a safe and reliable means of securing the door of freight cars. The frame of the car is represented by A, and the door by B. The lock is attached to the lower side and the bolt fits into the iron slide, C, as shown by the dotted lines. There is a guard, D, placed over the bolt which prevents dirt from getting in, and it is also a safeguard against picking or prying the bolt up by force. This invention is so simple that the reader will understand its operations and usefulness at a glance. A patent is now pending on it through the Scientific American Patent Agency. Further information can be had by addressing the inventor, E. W. Morse, Box 828, Chicago, Ill.



MORSE'S CAR LOCK.

The Iron Trade of the World.

Nothing, says the London *Mining Journal*, has so much contributed to the comfort and civilization of the human race is the development of the various industries and extended enterprises which owe their existence to an abundant supply of iron. Perhaps the most striking development of material progress during the last thirty-five years is the introduction of the railway system. During that period there have been constructed 113,000 miles of railway in the world; and this appears to us as the mere prelude to the extension of this enterprise on a scale so vast as scarcely any living man can conceive. There has been expended on these 113,000 miles of railway already constructed upwards of 40,000,000 tuns of iron.

Great Britain and France control the world, and, fortunately for the happiness of mankind, they seem to have elected in favor of peace; and their enormous resources, which might otherwise have been dissipated in war, will unquestionably be diverted to that other great enterprise, which we regard as having merely commenced—the construction of railways, which, proceeding at an increasing ratio, will only be retarded by the limited supply of iron that can be furnished by the mines of the world. The immensely increased demand for ships and steamers built of iron will also of itself form a large drain upon our production of this mineral.

There are now about 350,000 tuns of iron in warehouse-keepers' stores in Scotland, which is the only reliable reserve for a trade embracing 4,000,000 tuns per annum. The shipments of pig iron from Scotland this year have been 401,600 tuns, showing an increase of 26,649 tuns over the corresponding period of last year; and the foundries and malleable iron-works in this district have been so actively employed as to give rise to a consumption of about 12,000 tuns weekly.

It is rather a striking occurrence that recently upwards of thirty-five furnaces have been put out of blast in Staffordshire, although the price of pig-iron has ruled in that district from 70s. to 75s. per tun. Nineteen years ago the price of Scoth pig iron attained 120s. per tun, and for many months afterward it was maintained at above 100s. per tun. In 1854 the highest price was 92. 6d., and the average price for that year was 80s. per tun.

It may be noted as a singular feature in connection with the iron trade, that the highest range of prices for iron seems to be coincident with high rates of money.

THE NEGRO PROBLEM SOLVED, is the name of a new work by Hollis Reed, containing much interesting information touching Africa and the early history, character and attainments of the dusky race. The capability of the African for civilization, culture, and intellectual progress is also illustrated by many examples; the success of the Liberian republic is portrayed; and a brilliant future for the colored people is prophecied. A. A. Constantine, Publisher, 37 Park Row, New York.

A New Gun Metal.

A letter in the London *Times* from a distinguished English metallurgist, signed with the weil-known "Y," gives some interesting particulars respecting the new gun metal lately invented in Austria by Baron von Rosthorn. Before giving any account of this new alloy, the writer states his opinion that the days of wrought iron are numbered, and that its place will be soon supplied by steel in some form or other. The new alloy, which has received the name of "sterrometal," from a Greek word signifying tough or firm, is composed of copper, spelter, iron, and tin, in proportions that may be slightly varied without much affecting the result. In color it resembles brass rather than gun metal; it is very close in its grain and free from porosity. It is possessed of considerable hardness, and will take a very fine polish. Several eminent Vienna engineers have tried it for the cylinders of hydraulic presses with great success. Two specimens of the alloy have been submitted to rigorous tests by the Polytechnic Institute of Vienna and the Imperial Arsenal. The proportions used in each case were the following:—

	Polytechnic Institution.	Imperial Arsenal.
Copper	55·04	57·63
Spelter	42·36	40·22
Iron	1·77	1·86
Tin	0·83	0·15
	100·000	99·86

The specimen tested at the Polytechnic Institute gave the following results per sectional inch (English):—A bar prepared by simple fusion, bore a weight of twenty-seven tuns. Forged red-hot it broke at thirty-four tuns. Drawn cold, at thirty-eight tuns: the figures in the case of the specimen tried at the Imperial Arsenal being twenty-eight, thirty-two, and thirty-seven tuns respectively; while the best English gun metal, containing ten per cent of tin and ninety per cent of copper, broke at eighteen tuns under similar circumstances. The specific gravity of the metal is about 8·37 when forged hot.

These results, which are official, are truly astounding when we consider that the average breaking strain of wrought iron, as given by Mr. Anderson, of Woolwich Arsenal, is only twenty-six tuns, whilst that of the best steel is only thirty-five tuns per sectional inch. The elasticity of the sterrometal is also very great. It may be stretched 1-600th of its length without undergoing permanent elongation; gun-metal giving only 1-1590th, and wrought-iron 1-1500th. No surprise is, therefore, felt when we are told that a tube of sterrometal is capable of resisting a pressure of 763 atmospheres, a tube of wrought-iron of similar size and form giving way under 267.

Quoting Mr. Anderson, the writer concludes by saying that the best alloy for guns is yet to be discovered. It seems to us, however, that sterrometal is very near perfection. The subject of alloys is one that, with constant and persevering experiment must yield most valuable results, and we strongly advise any young chemist desirous of laurels and fortune to take up the matter. It seems singular that with all our boasted knowledge of chemistry and metallurgy, there are but half-a-dozen alloys that may be turned to economic uses.

[The statement that the tensile strength of the best steel is only 35 tuns per square inch of sectional area is too low. Specimens of cast steel have been known to bear a strain of 70 tuns per square inch before breaking.—EDS.

A Monkey Surgeon.

We vouch for nothing of the following from Cassel's "Popular Natural History," except the story, which is a pretty good one:—

"The small-pox having spread fearfully amongst the monkeys of South America, Dr. Pinckard, Secretary to the Bloomsbury-street Vaccination Society, was struck by the idea of arresting its further progress. Vaccination was, of course, to be the means of staying the plague, and his scheme for its introduction was entirely ingenious. He bound two or three boys hand and foot and then vaccinated them in the presence of an old monkey, who was observed to be closely attentive to the proceedings. He then left him alone with a young monkey, with some of the matter on the table, and beside it a lancet, guarded, that it might not cut too deep, by a projecting piece of steel. The doctor witnessed the result from a neighboring room; the old monkey threw the young one down, bound him without delay, and vaccinated him with all the skill of a professor."

NEW BOOKS AND PUBLICATIONS.

THE PRACTICAL WORKSHOP COMPANION. By Leroy J. Blinn. Henry E. Downer, Printer, 185 Jefferson avenue, Detroit, Mich.

This is a most useful little volume, containing numberless diagrams for cutting out tin, copper, and sheet iron work, with full instructions for practical men. There are also many receipts for varnishes, dyes, lacquers, compositions, both metallic and vegetable, whitewashes, etc. Every one can find use for this book. The scope of it is excellent, but the publisher has put it into the market in a most slovenly manner. The type is worn out, and the paper is miserable. It would have sold better if more consideration had been exercised on these points.

ART OF SAW-FILING. Holly. John Wiley, Publisher, 535 Broadway, New York.

We have just remarked in a previous notice on the slovenly mechanical execution of a book, and it is a positive pleasure to turn from it to this little work which has clear white paper, good sized full-faced type well printed with black, not grey ink, so that he who runs may read. It is a manual of 56 pages, with one or two diagrams on every page of saw teeth of all conceivable shapes. The object is to illustrate and describe various methods for filing saws, and it is exceedingly useful to wood-workers of all classes, from the sawyer down to the cabinet or pattern maker. Scroll web and compass saws, butchers and surgeons saws, each and all have their peculiarities delineated and described. It is a useful addition to the too scanty stock of mechanical text books.

"DEMOREST'S MIRROR OF FASHIONS," *Demorest's Monthly Mirror of Fashions*, and *The Illustrated News* have joined forces, and are hereafter to be published in one number. This periodical, in its present form, makes a good appearance. Subscribers to it receive with each issue a selection of paper patterns of garments in the latest style. To country patrons, who wish to appear attired in the prevailing mode, this will be an easy way of obtaining their desires. Single copies 25 cents. Sold by news agents generally.

APPLES ABUNDANT.—Apples are so abundant in Westmoreland county, Pa., that persons having orchards shake a great many off in order to keep the trees from breaking. And in some parts they are feeding them to the cattle, the supply being so great that they have no other way to dispose of them. They are now selling at 25 cents per bushel.

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THE MEASURE WORM.

We have before us a pamphlet containing a report made by H. A. Graef and Edward Wiebe to the Brooklyn Horticultural Society, on the worm that has so infested for several years the shade trees in the streets of Brooklyn and New York. The following extracts give the history of the worm and the plan proposed for its extermination:—

"The insect which for many years past has proved so destructive to the foliage of our most beautiful shade trees; which, on that account, has been so frequently the object of public discussion, complaint and apprehension, and the extermination of which seems now to have been resolved upon with all possible zeal and energy, appears in four different metamorphoses, viz:—1. As egg; 2. As caterpillar (larva); 3. As aurelia or chrysalis (pupa); and 4. As winged butterfly (moth or miller).

"1. As eggs they are deposited by the female moth toward the beginning of July, not only on trunks and branches of early thriving trees, but also on numerous other objects, to the number of from 20 to 250, in the shape of irregular clusters. During this period they are of about the size of a small pin's head, conical in form, and somewhat compressed at their points; first of a yellowish, then of a light or olive green, and later of a dark brown. They are covered with a thick, sticky, glueish matter and adhere strongly to the object on which they are deposited. They are usually found on the lower side of branches, and almost always below the connecting points of the same, apparently for their better protection and with the design of opening several avenues for the young brood to find subsistence. The number of eggs generally decreases from the basis of the branches toward their extremities.

"In this state the eggs remain unaffected by rain or frost, seemingly unchanged, until the time when our shade-trees unfold their first leaflets, which (subject to the weather) is usually between the 15th of April and the 15th of May.

"2. Little caterpillars then creep from these eggs, eagerly enjoying the rays of the sun on warm days, and carefully hiding themselves under the young foliage for protection on cold and stormy days. Here we find them in countless numbers crowded together, until after a very brief period they engage in their work of destruction. The young caterpillars always creep towards the extremities of the branches, led by their instinct to find there, first of all, the means for their subsistence, and make a retrograde movement only if they meet with any obstacle. They then devour the young foliage as quickly as it developes, so much so, that often a fortnight suffices to render a tree entirely leafless.

"If this occur before the worms have reached their full growth, they descend to the ground by means of silk-like threads, which they spin, apparently from their mouths. (In fact this thread producing matter issues from two holes, immediately above their mouths.)

"After having reached the ground they creep in all directions until they meet another tree or shrub, which they ascend in order to re-commence there their work of destruction with renewed, and by a short time of fasting increased, greediness.

"The trees are thereby not only deprived of their natural beauty, but other, and more serious consequences for the life of the tree result therefrom.

"If as late in the spring as the middle of June, trees are stripped of their foliage, it will be observed about the middle of July, that fresh, quite tender little branches begin to sprout, producing fresh leaves. The sap of the tree, intended to enlarge the thickness of its trunk and branches, and thereby to enhance the strength of the tree, is in such way employed to reproduce twigs, not provided for by nature, which in consequence thereof, always remain very slender, and from want of strength, usually bend downward.

"Frequently it also occurs that the wood of such twigs does not ripen enough to withstand the influence of an early frost, and they consequently must perish.

"During the time of their development the caterpillars cast their skin three times, and appear after the first peeling, light green or gray, after the second light-brown or olive, and after the third, dark-brown with irregular yellow spots and stripes. Immediately before and after these changes the caterpillars are inactive and apparently sick.

"If the caterpillar has reached its full growth it measures from one to one-and-a-half inch in length, by from one-twelfth to one-eighth of an inch in thickness. Its body is smooth and cylindrical. Its light-brown head is somewhat thicker than the body of the insect, and provided with exceedingly powerful labial palpi, with which to seize and grind its food.

"The insect has five pairs of legs, three of which are quite near its head, fully developed and of a horny substance; the two others, near the hinder extremity, are leg-like glands, by means of which they adhere so tenaciously to their object, as to be able to raise themselves perpendicularly, and permit themselves rather to be torn to pieces, than to give up that hold.

"In consequence of the separated positions of its legs, the insect's long, soft body is entirely without support in its middle. If this caterpillar were to creep like most of the other species, its unsupported body, when moving horizontally, would be dragged along and must be injured by sharp objects in its way. To avoid this a particular movement was provided for these insects. They stretch the fore part of their body as far as they can or wish to reach, attach their front legs to their object, and draw their hind legs close to the former. In so doing they always describe the form of a horse-shoe, and seem to measure the surface of the object on which they are creeping, which particularities have given rise to their name of measure worm (*Geometra*) or inch-worm.

"From certain organs, immediately under the skin on the backs of the caterpillars (as microscopic observations have disclosed), these insects are able to spin their silk-like threads, by means of which, as already stated, they descend and ascend the trees at their option. Frequently they remain suspended for a length of time, half way between the branches of the trees and the ground, apparently waiting for the moment when digestion has rendered them less heavy for the task of remounting their former more elevated position.

"On account of its thread-spinning ability, this caterpillar has sometimes been honored with the name of 'silk-worm,' and has by others been called 'black-worm,' on account of its dark color.

"For their perfect development the caterpillars need from five to six weeks, during which period they sometimes eat daily more than ten times their own weight. Then it is that they are most troublesome to us, partly and chiefly, by their destruction among our shade-trees, partly by the considerable amount of an unpleasant matter which they drop, and last, but not least, by the terror which, in their state of suspension, or dropping from the trees, they are apt to create among our ladies.

"After the caterpillar is fully developed, and has, in the meantime, accomplished its work of destruction, it enters its chrysalis state. When ready to be metamorphosed, it selects a safe place of refuge, either in the leaf-remnants, or on the trunks and branches of the trees, on fences, railings, lamp-posts, or almost anything it happens to reach. Here they enclose themselves in a texture, irregular in shape and net-like, and remain there without any food, apparently lifeless, faithfully expecting the hour of their resurrection.

"In this period they form into a pupa (*aurelia, chrysalis*), half an inch in length, of a conical form, and of a gray or brownish leather-color, dotted with numerous black spots on its back extremity. After the expiration of ten or twelve days, these pupæ have finally reached the last stage of their existence. They burst the hardish case in its front part, and out comes the winged animal, miller or moth, in science known under the names of *Ennomos subsignaria* (Hubner), or *Geometra niveosericearia* (Harris).

"4. The wings of the new-born insect develop very rapidly. Soon after being released from its imprisonment the moth is seen, sitting quietly on the lower surface of objects drooping its wings, apparently that they may become by their own gravity, entirely unfolded, and developed to their full length. Subsequently the females are observed in well protected places, incessantly shaking their wings, as it were, to attract the attention of the male insect, and then the sexes pair, whereupon the female, as previously stated, deposits her eggs and soon after dies. The male miller, the smaller of the two sexes, is lively and has combed or feathered, but the female is larger, thick-bodied and sluggish, and has thread-like antennæ. The former generally lives a few days longer than the latter and both are said (in the opinion of most authors), not to take any food whatsoever. But as nature has provided these millers with perfectly developed probosces, certainly not without a design, it remains doubtful whether they do not take some food during the night on trees, when it is difficult to observe them.

"It is truly a strange freak in nature, to lavish so much time in creating a being, which, in its perfect state, exists only from eight to ten days, while it requires nearly 355 days for its development.

"The hatching of the caterpillar eggs is dependent on the same cause, which also circulates the sap of the trees, namely: a sufficient degree of warmth. Warm weather early in spring calls forth early foliage and with it the innumerable hosts of young caterpillars. If warm weather sets in later both are retarded accordingly.

"Not all species of shade-trees, as is well known, bud at the same time. Some of them, as linden, maple, elm and some others are always a fortnight earlier than ailanthus, paulownia, sycamore, etc., and the young caterpillars always keep pace with the early ones. The moths, then, follow only their natural instinct in depositing their eggs almost always on linden, maple and elm trees. And, when we catch a female miller, selecting an ailanthus, sycamore or even a lamp-post on which to perform her sexual duty, we may rest assurred that from some physical cause she was prevented from acting according to her natural instinct. For, should the caterpillars creep out before the leaves appear, they would only begin to live in order to die for want of food.

"If one tree in the neighborhood has been entirely stripped of its foliage before the caterpillars who were born on it, have become fully developed, they migrate to the next tree, to satiate their craving hunger and to escape premature death from starvation. Under such circumstances no tree, of whatever description it may be, is safe from their attacks."

The ailanthus, catalpa, cypress, European loch, tulip tree, paper mulberry, imperial paulownia, button wood and locust, are never attacked by young caterpillars, but are visited only in cases of necessity.

"If our plan of destruction should be adopted and carried out, we would immediately begin our work with scraping the measure worm eggs from all the trunks and branches of the infested trees. This scraping of eggs from trees can be performed through almost all the winter season. During the latter half of April or somewhat before the young caterpillars begin to creep out, tar-rings, four inches wide, are to be applied around the trunks and stronger branches of trees in proper places. These will not dry in a fortnight and all small twigs below them are cut, to have no leaves appear in such places. By such means the young brood must starve to death, as they are separated by the tar from their food, and in trying to pass it, they unavoidably will adhere permanently to the sticky matter. Such caterpillars as may be found beyond the tar-rings, crowding together as long as they are small, in large numbers on single leaves or branches, are to be removed, together with leaves and twigs, by means of hedge-shears.

"Such as may escape these operations will be syringed with a strong tobacco infusion, or destroyed still later by daily repeated beating or jerking of the trees and branches by means of proper tools and machinery. The heavier the caterpillars grow the more effective this last method of destruction will prove, as it is well known, that if suddenly attacked and surprised, they give up their hold and drop to the ground in large numbers. Such caterpillars as should escape all these prosecutions and reach the time when they enter their chrysalis state, are to be gathered as cocoons from their hiding places and destroyed, as will be done with the millers, which, in spite of the most careful attention, perhaps may come to perfection. As soon as they appear, they will be caught in nets, or syringed on the trees like the caterpillars, and will drop by jerking the trees

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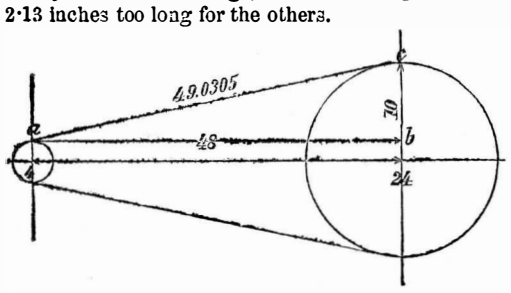
and branches. Some of the male millers will perhaps escape during these proceedings; the more sluggish and heavier females, however, will certainly fall and can be easily destroyed."

Correspondence

A Simple Rule for Calculating the Size of Cone Pulleys.

MESSRS. EDITORS—The rule for ascertaining the size of cone pulleys and length of belts given on page 134, SCIENTIFIC AMERICAN, current volume, I do not consider very accurate in its results. Suppose we wish to find the proportion of a set of cones of which the largest and smallest sizes are respectively 24 and 4 inches, distance between centers 48 inches. Now the diameter of two equal pulleys that will require the same length of belt as the above, will be very near 14·65 inches each. By the usual plan of making them increase or decrease in an arithmetical progression the sizes of the two equal pulleys would be 14 inches, which is 0·65 of an inch too small. By the rule above referred to they would be 15·33 inches—nearly 0·68 inch too large, and would require a belt 2·13 inches too long for the others.



The rule which I use is very nearly accurate and is as simple as any that I have seen proposed. Let the distance between the centers be the base of a right-angled triangle, as *a b*, and the difference between ~~the semi diameters~~ of the two pulleys the perpendicular, as *b c*. Square the base and perpendicular, which in the above example are respectively 48 and 10 inches. The square root of the sum will give the hypothenuse. Twice that added to one half the circumference of each pulley will give the length of belt which, in this case, is nearly 142·03 inches : $\sqrt{48^2+10^2}\times 2 = 98·06 + 37·69 + 6·23 = 142·03$. Subtract twice the distance of the centers (=96 inches) from 142·03 the remainder divided by 3·1416 will give 14·65, the diameter of two equal pulleys, to fit the above length of belt. 142·03 − 96 = 46·03 ÷ 3·1416 = 14·65.

If intermediate pulleys are required they can be obtained by the rule referred to in the first paragraph or on page 85, which is near enough for all practical purposes. L. WILLIAMS.

South Shaftsbury, Vt. August 28, 1864.

[Our thanks are due to the gentlemen who have forwarded us their methods of arriving at the sizes of cone pulleys. We are pleased to publish all communications that are intrinsically sound, but such publication is no proof that we think the same as the correspondent does. Every man has a right to be heard when he does not talk nonsense. The information afforded by this class of correspondence is valuable, and we desire to encourage it. Having shown up the cone pulley subject pretty well, perhaps some of our obliging correspondents will forward their methods for calculating change wheels for cutting screws, both fractional and even pitches.

A Hint to the Ingenious.

MESSRS. EDITORS:—There is wanting a neat small machine to put revenue stamps on card pictures. one that worked well and could be sold cheap would meet with a large sale. A hint to your inventive patrons is perhaps all that is necessary.

PHOTOGRAPHER.

New York, Sept. 10, 1864.

DISSOLVING POWERS OF THE PANCREATIC JUICE.—M. Corvisart has shown that in animals the pancreatic juice has the power of dissolving albuminous foods without the assistance of the gastric juice or the bile; and now he has demonstrated the same thing in man. A hospital patient, in perfect health, having suddenly died from chloroform administered for the reduction of the femur, M. Corvisart removed the pancreas, and with the prepared juice and ferment of it, operated on albuminous matters. He found that a large quantity of albumen and fibrin was rapidly digested with its assistance.

Formulas for determining the Dimensions of Small Gears by Diametral Pitch.

We are indebted to Messrs. J. R. Brown & Sharpe, the well-known machinists of Providence, R. I., for the following valuable tables. They were originally made especially for this firm:—

Let P denote the *diametral pitch*, or the number of teeth to one inch of diameter of pitch circle.

D′ the diameter of pitch circle. } Larger Wheel.
D the whole diameter. }
N the number of teeth. }
V the velocity. }
d′ the diameter of pitch circle. } Smaller Wheel.
d the whole diameter. }
n the number of teeth. }
v the velocity. }
} These wheels run together.

a the distance between the centers of the two wheels.
b the number of teeth in both wheels.
t the thickness of tooth or cutter on pitch circle.
D″ the depth of tooth.

The examples placed opposite the formulas below are for a *single* wheel of 12 pitch, 6·166 inches or $6\frac{2}{12}$ inches diameter, etc.; and in the case of the *two* wheels the larger has the same dimensions. The velocities are respectively 1 and 2.

FOR A SINGLE WHEEL.

Formulas.	*Examples.*	
$P=\frac{N+2}{D}=\frac{72+2}{6·166}$ or $\frac{72+2}{6\frac{2}{12}}$	$=12$	1.
$P\frac{N}{D'}=\frac{72}{6}$	$=12.$	2.
$D'=\frac{N}{P}=\frac{72}{12}$	$=6$	3.
$N=P\ D'$	$=12\times 6=72.$	4.
$N=PD-2=12\times 6·166-2$, or $12\times 6\frac{2}{12}-2$	$=72.$	5.
$D=\frac{N+2}{P}=\frac{72+2}{12}$	$=6·166$, or $6\frac{2}{12}.$	6.
$D=D'\div\frac{2}{P}=6+\frac{2}{12}$, or $6+·166$	$=6·166.$	7.
$t=\frac{1·57}{P}=\frac{1·57}{12}$	$=·130.$	8.
$D''=\frac{2}{P}=\frac{2}{12}$	$=·166$, or $\frac{2}{12}.$	9

FOR A PAIR OF WHEELS.

Formulas.	*Examples.*	
$b=2aP$	$=2\times 4·5\times 12=108.$	10.
$n=\frac{b\ V}{v+V}=\frac{108\times 1}{3}$	$=36.$	11.
$N=\frac{n\ v}{V}=\frac{36\times 2}{1}$	$=72.$	12.
$n=\frac{N\ V}{v}=\frac{72\times 1}{2}$	$=36.$	13.
$N=\frac{b\ v}{v+V}=\frac{108\times 2}{3}$	$=72.$	14.
$n=\frac{PD'V}{v}=\frac{12\times 6\times 1}{2}$	$=36$	15.
$V=\frac{n\ v}{N}=\frac{36\times 2}{72}$	$=1.$	16.
$v=\frac{N\ V}{n}=\frac{72\times 1}{36}$	$=2.$	17.
$v=\frac{P\ D'V}{n}=\frac{12\times 6\times 1}{36}$	$=2.$	18.
$D=\frac{2a(N+2)}{b}=\frac{2\times 4·5\times(72+2)}{108}$	$=6·166.$	19.
$d=\frac{2a(n+2)}{b}=\frac{2\times 4·5\times(36+2)}{108}$	$=3.166.$	20.
$a=\frac{b}{2P}=\frac{108}{2\times 12}$	$=4·5.$	21.

Our Burden and our Strength.

We have received from Mr. David A. Wells a pamphlet with the above title, written to show the ability of the country to pay the principal and interest of any debt likely to be incurred in the prosecution of the war. We make the following extracts:

TABLE *showing the present and prospective debt, interest and population of the United States with the present debt, interest and population of Great Britain, France, Austria, Italy and Holland.*

	Public Debt.	Population.	Annual interest.	Debt to each person.	Av.int to each person.
U. S. (loyal), July 1864	$1,750,000,000	24,900,000	$75,000,000	$72 92	$3 01
At close of war, (assumed) 1865,.	3,000,000,000	34,000,000	180,000,000	82 35	5 35
In 18.0, assuming 30 per ct. as av. dec. in. of pop..	3,000,000,000	40,950,000	180,000,000	73 23	4 38
In 1880, do.....	3,000,000,000	53,235,000	180,000,000	56 34	3 35
In 1890, do.....	3,000 000,000	69,205,500	180,000,000	43 35	2 60
In 1900, do.....	3,000,000,000	89,964,150	180,00),000	33 34	2 00
Gt. Br., March, '63.	3,915,000,000	30,000,000	127,564,000	130 46	4 25
France, 1862.....	2,206,000,000	37,000,000	110,000,000	59 65	3 00
Austria, 1863.....	1, 63,000,000	35,000,000	.....	36 10	....
Italy, 1863.....	764,000,000	22,000,000		34 73	....
Holland, 1863.....	424,500,000	3,600,000	12,244,000	117 00	3 40

It would thus appear from the above table (the figures and estimates of which are, it is believed, entirely reliable) that assuming the actual national debt at the close of the federal fiscal year, June, 1864, to be $1,750,000,000, the apportionment of debt to each individual of the loyal States would be $72 92, and of the annual interest, $3 01. If we assume further, that the war terminates at or before the close of 1865, and that the national debt has reached at that period the sum of $3,000,000,000, then the debt for the population of the restored Union will average $82 35 for each individual, and the annual interest $5 35. Supposing the debt to remain the same, (*i. e.*, $3,000,000,000) and the population to increase in the ratio of only 30 per cent. for each decennial period, the table shows the rapid decrease of individual liability for debt and interest during the remaining years of the present century.

TABLE *showing the population and wealth of the United States by decades from* 1790 *to* 1800; *population of the loyal States in* 1864; *decennial per centage increase of population; decennial per centage increase of national wealth; average property to each person; average annual value of the national product.*

Year.	Population.	Value of real and personal property.	Decennial per cent increase of pop'n.
1790.....	3,929,827	(estimated) 750,000,000	.....
1800.....	5,305,937	(estimated) 1,072,000,000	35·02 per cent.
1810.....	7,239,814	(estimated) 1,500.000,000	36·43 per cent.
1820.....	9,638,131	(estimated) 1,882,000,000	33·13 per cent.
1830.....	12,866,020	(estimated) 2,653,000,000	33·49 per cent.
1840.....	17,069,453	(official) 3,764,000,000	32·67 per cent.
1850.....	23,191,876	(official) 7,135,180,000	35·87 per cent.
1860.....	31.500,000	(official) 16,159,000,000	35·59 per cent,
1864.....	Loyal States. 24,900,000	(estimated) 15,300,000,000	four years } 12 per cent.
1865.....	Rest'd Union assumed. 34,000,000	(estimated) 21,574,000.000	.....

Year.	Decennial per cent increase of wealth.	Av. property of each person.	Av. annual value of nat.l. product.
1790.....	.....	$187 00	$187,500,000
1800.....	43 per cent.	202 13	300,000,000
1810	39 per cent.	207 20	420,000,000
1820.....	25·4 per cent.	195 00	526,960,000
1830.....	41 per cent.	206 00	742,840,000
1840.....	41·7 per cent.	220 00	1,063,135,000
1850.....	89·6 per cent.	307 67	2,004,000,000
1860.....	126·42 per cent.	510 09	3,804,000,000
1864.....	four years } 40 per cent.	614 95	4,018,000,000
1865.....	.....	634 52	5,713,500,000

No estimate of further resources of the country, furthermore can be considered complete, which fails to take into account the great augmentation of values which is sure to accrue in time to the South from the substitution of free for slave labor. This matter is set in a clear light by the following statement, which any one who doubts can verify for himself by referring to the official statistics of the census of 1860:

If the product per head of the population in the Slave States had been the same in 1859 *that it was in the Free States, there would have been added to the aggregate national wealth returned at that time the additional value of* $1,531,631,000—a sum nearly equal to the entire national debt, June, 1864.

UPWARD of 40,000 bales of cotton were dispatched from Shanghae for Liverpool during the month of May.

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WASTED COAL.

Coal is 12 to 13 dollars per tun. That means something when a winters supply has to be laid in. In the use of it the most prodigal wastefulness is practised, doubtless because it is black and dirty, and does not look nice; it ought therefore to be got out of the way as soon as possible.

One-third of every tun of coal burned by servants is wasted. Not alone in reckless burning but in actual, wanton, waste. The coal is as certainly lost as if a third were left in the street instead of being put in the cellar. It is wasted in the ashes; fresh coal falls out of the grate in replenishing it, and this, with that remaining in the fire at night, and charred half burned lumps, amounts to fully one third of the quantity actually used. This is a most unnecessary and wicked waste, and if servants cannot be induced or made by surveillance to correct the abuse, it would pay householders to look after it themselves.

In the matter of burning coal there is also a great want of intelligence, and it is not to be expected that common servants will know, or care much about saving it. The grate of the range is stuffed so full that the oven top is loaded with it, so that the fire will not die out or require looking after; then the draft is opened and the money, or what is the same, the heat, goes flying up the chimney. With a little forethought all this could be prevented, and a tun of coal made to last three months instead of one. A good, bright fire can be steadily maintained with coal with less trouble than with any other kind of fuel, but not by raking, poking, and piling in green fuel continually. After breakfast the fire should be cleared of ashes, if there are any, and fresh fuel put on to fill the grate moderately. Let the over damper be turned up so as to heat it, and leave the small top door open, more or less, according to the intensity of the heat required. In this way air enters over the top of the fire and maintains a far better combustion, and consequently greater heat than when the draft dampers are thrown open. A washing can be done or "ironing" accomplished with one-third less coal than is generally thought necessary to use.

So far as sifting ashes for the cinders they contain is concerned, it is hopeless to expect much change. Hundreds of poor families in cities live off of the waste of their improvident neighbors, and in this way there is something used which would otherwise be lost, but it seems to us that charity should be practised in a different and more positive manner. If the proverb be true that "Charity begins at home," then we have a still stronger argument against this wasteful practice. Cinders will burn admirably in small cylinder stoves, and heat a nursery or a laundry as hot it should be. Every shovel full saved is a shovel full of coal put in the cellar, and a hint to the wise is enough on this point.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week ; the claims may be found in the official list:—

Weaving Machine.—The object of this invention is an attachment to looms calculated to obviate the difficulties attending the treadle machines or draw looms, with a large number of shafts and to supersede the jacquard machine, an attachment which is so arranged that, for the production of a certain picture or design, no cards, or only a very limited number, are required, and which admits an innumerable variety of changes in the picture, pattern or design, without loss of time or expense; and each portion of the picture can be formed or combined in any desirable manner also without loss of time. F. M. Wolf, of Glauchau, Saxony, is the inventor.

Apparatus for drying and desiccating Vegetables.—This invention consists in a horizontal air flue communicating by means of a series of vertical tubes with the interior of a tower containing movable perforated shelves or aprons, in combination with a furnace, the heat from which strikes the bottom plate of the horizontal air flue, over which it passes between the vertical tubes, in such a manner that the air, passing through the horizontal flue and vertical tubes, is heated to a high temperature before it ascends into the tower, and the vegetables or other articles or material moving down over the inclined movable shelves or aprons, are rapidly desiccated and dried. The invention consists, further, in the arrangement of adjustable shutters and zig-zag flues in combination with the movable perforated shelves and aprons in such a manner that by opening or closing said shutters the heat can be thrown in direct contact with the lowest shelves or made to pass round two or more of the lowest shelves and brought in contact with the lowest apron, and by these means the articles or material to be desiccated can be exposed to a greater or smaller heat during various stages of the operation. J. A. Miller, of New York city, is the inventor, who has assigned his patent to Chas. Alden, of Newburgh, N. Y.

Paper-cutting Device.—This invention relates to a new device for cutting paper from a contiguous roll into strips. The invention is designed more particularly for cutting paper for the manufacture of paper twine, but it may be advantageously used for other purposes where paper requires to be cut into narrow strips. The invention consists, first, in the employment of two rollers in connection with a grooved cylinder and a cylinder of cutters, arranged in such a manner as to answer the proper cutting of the paper in an expeditious manner. The invention consists, secondly, in the employment of two sets of receiving rollers, whereby the cut paper strips are wound upon their respective blocks without the liability of one strip lapping over or upon the block of the strip contiguous to it. The invention consists, thirdly, in a novel manner of attaching the blocks on which the cut strips are wound, to their shafts, whereby the strips are wound compactly on the blocks, and without subjecting the former to any undue strain or tension. J. B. Wortendyke, of Godwinville, N. J., is the inventor.

Cane-juice Evaporator.—This invention consists in the application of two revolving pans to a furnace with a return flue, in combination with a damper, in such a manner that, by revolving said pans, either of the two can be brought over the hottest part of the furnace, and by opening the damper a current of cold air can be passed under that pan not directly over the furnace whenever it may be desirable, either for the purpose of drawing off its contents or cooling the pan; the invention consists, further, in the combination with two revolving pans placed over a return flue of a third pan set on an arch which forms the continuation of the return part of the first flue, in sach a manner that the surplus heat escaping from the return flue can be advantageously used for the purpose of heating the juice previous to its introduction into the revolving pans. S. F. Woodworth, of Iowa Falls, Iowa, is the inventor.

Fastening for Doors and Windows.—This invention consists in two double-armed lever bits applied to a common revolving barrel and operating in combination with spring frames which carry the bolts and move in opposite directions in such a manner that by turning the barrel in either direction the bolts are drawn in simultaneously, and the door, window, or other device is unfastened and by releasing the barrel the springs acting on the frames force the bolts out to the proper position for fastening the door or window; the invention consists also in a sliding or oscillating latch, in combination with the reciprocating spring frames and bolts in such a manner that by the action of said latch the frames are locked and the door or window can be securely fastened. Henry Wilkinson, of Newburgh, N. Y., is the inventor.

Curious Calculations.

The simple interest of one cent, at six per cent per annum, from the commencement of the Christian era to the close of the present year 1863, would be but the trifling sum of eleven dollars, seventeen cents, and eight mills; but if the same principal, at the same rate and time, had been allowed to accumulate at compound interest, it would require the enormou, sum of 84,840,000,000,000 of globes of solid golds each equal to the earth in magnitude, to pay the interest; and if the sum were equally divided among the inhabitants of the earth, now estimated to be one thousand millions, every man, woman, and child would receive 84,340 golden worlds for an inheritance.

Were all these globes placed side by side in a direct line, it would take lightning itself, that can girdle the earth in the wink of an eye, 73,000 yeally a travel from end to end. And if a Parrott gun were discharged at one extremity while a man was stationed at the other—light traveling 192,000 miles in a second; the initial velocity of a cannon ball being about 1,500 per second, and in this case supposed to continue at the same rate; and sound moving through the atmosphere 1,120 feet in a second—he would see the flash after waiting 110,000 years; the ball would reach him in seventy-four billions of years; but he would not hear the report till the end of a thousand millions of centuries. Again, if all these masses of gold were fused into one prodigious ball, having the sun for its center, it would reach out into space, in all directions, one thousand seven hundred and thirty millions of miles, almost reaching the orbit of Herschel or Uranus; and, if the interest were continued till the end of the present century, it would entirely fill up the solar system, and even encroach five hundred million of miles on the domain of the void beyond the planet Neptune, whose orbit, at the distance of two thousand eight hundred and fifty millions of miles from the sun, encircles our whole system of worlds.

MISCELLANEOUS SUMMARY.

USING LOADED SHELLS IN COOKING.—On the morning of Sept. 14, three soldiers at Fort Slocum, near Washington, gathered a number of shells to use as supports for their kettles in cooking, supposing of course that the shells were empty. But one of them proved to contain a charge, and exploded, so severely wounding Henry Bouquet and B. F. Marshall that each was obliged to undergo the amputation of a leg by Dr. Bontron, of Harewood Hospital. Dennis Hare was also severely wounded in the left arm. The injured men belong to Company A, First New Hampshire heavy artillery. They say that they had frequently before made use of shells for similar purposes.

FOWLER'S STEAM PLOW.—Mr. Wellington Lee, patentee of the Lee and Larned steam-fire engine, has recently returned from England with one of Fowler's steam plows. This machine works by drawing the plow over the field while the engine is stationary, Mr. Lee proposes to introduce the plow here, being confident of its success. In England it is universally approved and an acre can be plowed for one-half the cost of horse-power. This plow will not be exhibited at any of the State fairs, but is to be immediately put to practical work at the West, when the public will be fully informed of the results.

DURING the month of November last the piercing of the Mont Cenis tunnel advanced at the rate of 3 feet 8 inches per day at the north end and 4 feet 9 inches at the south end. On the first of January the tunnel had penetrated the mountain three-fourths of a mile at the north end and 45 yards over a mile at the south end.

THE TAXES OF ONE FIRM.—The *Coal Oil Circular* gives a long description of the works of a firm engaged in refining petroleum in the oil region of Pennsylvania, and states that the taxes which this firm will pay to the United States Government will amount to $1,200,000 per year.

THE *Dictator*, iron-clad Ericsson battery of the sea-going class, is now completed and has been assigned an important expedition. She will depart about the first of October.

POWER REQUIRED TO START A TRAIN.—Several extremely interesting communications on this question are unavoidably crowded out but will appear in our next issue.

SPECIAL NOTICE.

JAMAS LEFFEL, of Springfield, Ohio, has petitioned for the extension of a patent granted to him on Dec. 10, 1850, for an improvement in lever jacks.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, Nov. 28, 1864.

All persons interested are required to appear and show cause why said petition should not be granted. Persons opposing the extension are required to file their testimony in writing, at least twenty days before the final hearing.

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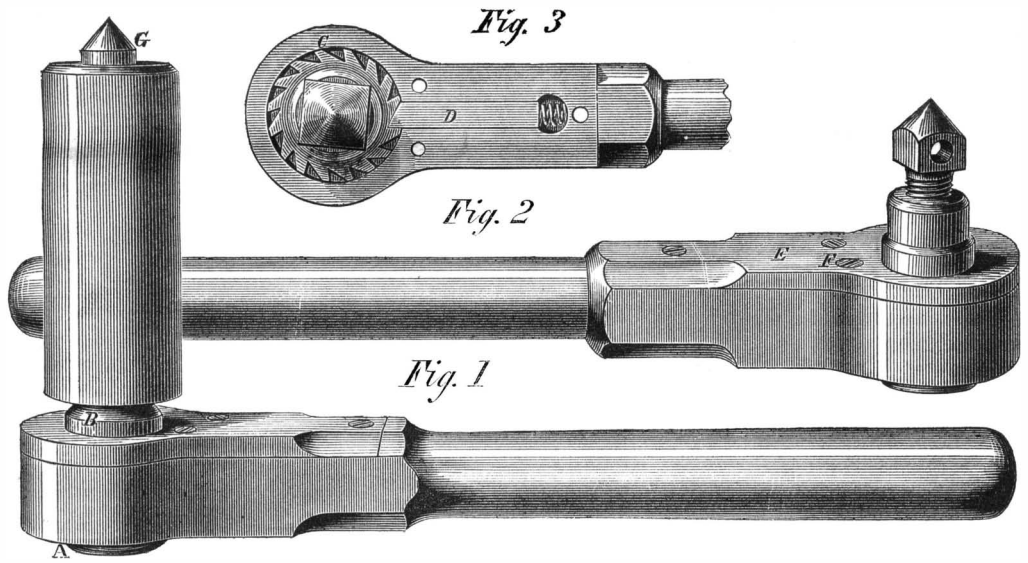
Improved Ratchet Drill.

The ratchet drill, oftener called a "pawl wrench," is an indispensable tool in or out of the machine shop. It is so common now that no special explanation of its uses is nscessary. It is only of late that they have become an article of commerce, for though they have been used for many years in machine shops other trades have been contented to employ a clumsy, hard-working brace in lieu of this tool. For boiler-makers, machinists, engineers, gas-fitters and plumbers, this style of wrench is an extremely convenient one, since it is strong where strength is needed, and at the same time light and durable. The drill socket, A, Fig. 1, the feed screw, B, and the ratchet wheel, C, Fig. 3, are all forged in one piece, and are case-hardened in a peculiar manner, so that the teeth have all the toughness and endurance of steel. The shape of the teeth is also well devised for strength, and the pawl or detent which takes the teeth is well supported on each side, so that it cannot break by careless usage or become clogged with dirt and grease. The plate, E, covers all the working parts so that they are completely secured from injury by being thrown down carelessly among other tools. The screws, F, which confine the plate, E, are neatly fitted to their places, and the necks of the screws, under their heads, run down into the solid metal below so that there is no danger of their breaking; they also serve as steady pins for the plate, E. The wrench shown in Fig. 2 is suited for narrow passages or places inaccessible by the larger wrench. The steel center, G, Fig. 1, is fitted to a tapering hole so that it can be easily driven out and turned up or hardened when it becomes necessary. This is a very neat ratchet wrench, and large numbers of them have been sold. None but the best materials are used in the construction of these wrenches. (See advertisement on another page.) It was patented on the 11th of August, 1863, by E. A. Raymond, Brooklyn, N. Y. For further information address the manufacturers, C. Merrill & Sons, 556 Grand street, N. Y.



RAYMOND'S RATCHET DRILL.

A STRIDE IN THE POWER OF COMMUNICATION

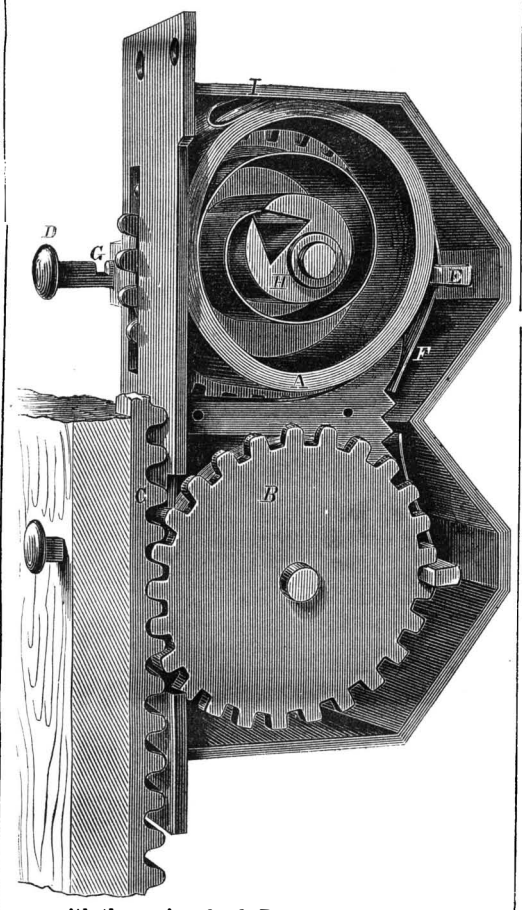
At the time of the discovery of this continent by Columbus, Mexico was inhabited by a semicivilized people, with large and populous cities, with an organized monarchical government and settled civil polity, with rights of real and personal property fully defined, with a division of labor among masons, weavers, goldsmiths, painters and other artisans, and, finally, with the art of picture writing. In Peru was a similar monarchy, in which the vast stores of grain and the excellence of the roads excited the wonder of the Spanish conquerors. And yet these two great communities, though living in such close neighborhood, were wholly ignorant of each other's existence!

Now the work is being pushed rapidly forward of constructing a telegraph cable around the world, when the three continents of Europe, Asia and America will be in instantaneous communication with each other.

Revolution in a Printing Office.—On the 7th Sept. the entire force of compositors on the Chicago *Times* was dismissed and forty young women were instituted. The proprietors of the *Times* had been preparing for this course several months, ever since the strike, and had these girls under instruction in private rooms about the city. This movement has caused great sensation among the printers, as it was understood that the *Times* had resolved to break up the printers' association. This association took advantage of the proprietors of the *Times* and sought to control or destroy their business. In turn the publishers have thus attacked the association,

SHAW'S WINDOW-SASH STOP.

This invention is intended to facilitate raising window sashes and support them at any desired hight. It entirely dispenses with the use of cords, balances, or sash-weights of any kind, and is a strong and durable fixture. A set of these fixtures have been on one of the windows in the Scientific American office for three months past; during that time they have been used almost daily, but as yet we have no trouble with them from any cause; they work well. The spring is so arranged as to help raise the heavy sash instead of requiring main strength for the purpose. The spring, A, is coiled up by the descent of the sash; a slight push in addition to the weight of the same being all that is necessary to do this. When the sash is lifted the spring uncoils and imparts its elasticity to the sash through the gear, B, which works in the rack, C, fastened to the side of the sash. The knob, D, projects through the frame and connects with the stop, E; this latter is always kept in



gear with the main wheel, B, by the spring, F, unless pushed out, or it can be kept out permanently by means of the slot, G, in the rod of the knob, D. One of the springs is for the upper and the other for the lower sash, and the eccentric, H, simply holds one end of the spring so that it winds up on it, while the other end is hooked over a projecting part of the casting, I. The whole apparatus sets in a light cast-iron box, covered with a plate to exclude the dust, and the operation is as hereinbefore described. The invention was patented on the 19th July, 1864, by Wm. Shaw, of Hudson, N. Y., of whom all information relative to the sale of county or State rights can be obtained. All other information can be had of C. B. Shaw, Station A, Brooklyn, N. Y.

DEPARTURE OF THE "RE DON LUIGI DI POR TUGALLO."

The last of the two armored ships, built for the Italian Government by William H. Webb, Esq., departed for Genoa on Monday the 12th inst. On that occasion a select party of gentlemen—members of the press and others—accompanied the frigate down the harbor to Sandy Hook to see her safely on her way.

The frigate has been under construction nearly two years, and her performances, as well as that of the twin vessel, the *Re de Italia*, built for the Italian Government, have been in the highest degree satisfactory. A few details will be acceptable to distant readers. The vessel is of the largest class—7,000 tuns burthen, 285 feet long, 35 feet beam, draught of water 24 feet, 9 inches. Her contract speed, when ready for sea, was to be 10 knots, and she has not only attained but exceeded it by one knot even with new engines. She is iron-clad with plates 4½ inches thick, and the *Re-de-Italia*, consort to this ship, crossed the ocean at the rate of ten miles an hour.

The engines are of the largest size and finest finish. They have cylinders 84 inches in diameter by 3 feet 9 inches stroke, and are back-acting, fitted with expansion gear. The boilers are six in number, of the horizontal tubular type, fired from amidships, and supply steam in great abundance, so much that but four of them are generally worked; with these the consumption of coal was about two tuns and a half per hour. The screw is brass two-bladed, 19 feet diameter and 31 feet mean pitch.

Throughout the brief trip we enjoyed on this vessel they worked admirably, there being no thumping or pounding below, which is so common in screw engines. They were built by the Morgan Iron Works, Geo. W. Quintard proprietor, and reflect the highest credit on the ability of these Works to produce steam machinery of the largest class.

So finely has Mr. Webb modeled this ship that there was no perceptible vibration when standing directly over the screw; and from keel to main truck she is as fine a specimen of an iron-clad frigate as Neptune ever kissed.

The return trip in a small steamer was the scene of much speech-making, congratulation and collation. As usual on these occasions every one felt magnanimous, and the guests individually and collectively sent their best wishes with the departing frigate.

Gas Foot-warmers.

Many persons are greatly annoyed by cold feet; and although gas-stoves for heating apartments and cooking purposes are coming greatly into use, we find nothing introduced for foot-warming. Will not some enterprising manufacturer get up an article specially adapted for the feet. A nice little article made of porcelain, not much larger than a spittoon, would sell in this market very readily. By keeping the feet warm both health and comfort are greatly promoted.

A great billiard match for the championship and the golden cue, between Dudley Kavanagh, of New York city, and Philip Tieman, of Cincinnati, came off on Thursday evening, Sept. 15, at the Hippotheatron, in this city, and resulted in favor of Kavanagh. The game was a carrom one of 1,500 points, and lasted four hours and a half. At the close the score stood: Kavanagh 1,500, Tieman 926.

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THE

Scientific American.

MUNN & COMPANY, Editors & Proprietors.

PUBLISHED WEEKLY AT

NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London, England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent to them will be promptly attended to.

VOL. XI. NO. 13....[NEW SERIES.]....*Twentieth Year.*

NEW YORK, SATURDAY, SEPTEMBER 24, 1864.

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THE PITCHES OF SCREW-THREADS.

In previous numbers of the SCIENTIFIC AMERICAN we have alluded to the importance of this subject and stated some reasons for fixing the pitches of bolts at one standard, so that from Maine to California a quarter-inch bolt should be the same; and so for all other sizes. This proposition is made with reference to what may be called the bolts of commerce, or those used in every-day work on carts or steam engines, on wind-mills, water-wheels, printing presses, or what not. As the case now stands it is ten chances to one that a bolt made in one town will fit the hole tapped in another town, so that if a printing press, for example, breaks down for want of some important bolt, the proprietor must send miles to get another, or else tap the hole with one of a half-thread difference in the inch, and so spoil it. One illustration will suffice; there is no occasion to pursue this branch of the subject further.

It is a simple matter to make $\frac{7}{8}$ths taps, 8 threads to the inch the country over, or $\frac{1}{4}$th taps 20 threads; but some of our correspondents, in alluding to this subject, have endeavored to confuse the subject and make a plain matter complex. These persons go to work with elaborate tables and show conclusively that the pitches cannot be made uniform in their sense of the word. They say that in developing or enlarging the threads, the angle of the sides, and the length of base to an inch of rise will not be the same, therefore the thread cannot be made uniform in practice. We never said it could, in that way, and we never looked at the subject from this light, because it has no bearing on the case in point. Let us have a uniform system of threads both in depth and pitch for common sizes, and let the angles of the sides, and the length of base take care of themselves. By so doing much time and money will be saved to manufacturers.

WHY GOLD IS SO HIGH.

There is but one cause of the high price of gold, and that is the excessive quantity of our paper currency. The thing that fluctuates so in value is not the incorruptible yellow metal, but the green notes that promise to pay their face in this metal at some future time.

When our currency was all specie-paying, and therefore of the same value as specie, the quantity in the country amounted to some 200 or 250 millions of dollars. This was the quantity that fell to our share in the natural distribution of the money of the world by the inexorable laws of trade. It was just the quantity that we needed to effect the exchanges of property that we were in the practice of making in the course of our trade. If we had wanted any more we should have sent abroad some portion of our 16,000 millions of property and exchanged it for the desired amount of money. If we produced more in our own borders, as we did not want it we sent it abroad and brought in property that we did want in exchange.

We now have in circulation some 600 or 700 millions of paper money, and its aggregate value is just the same as the 200 or 250 millions of the old specie-paying currency. This aggregate value of our currency is fixed by the laws of trade and we cannot alter it. If we should increase the amount of our currency to 1,000 millions, it would, provided its credit was unimpaired, be worth 20 cents on the dollar—in other words, the price of gold would be 500. But if we should diminish the paper in circulation to 200 millions, it would be worth 100 cents on the dollar, or gold would be at par.

We hear of powerful combinations of the Wall street brokers to keep the price of gold from rising, or to keep it from falling. Those gentlemen might just as well get up powerful combinations to keep the tide from rising and falling. As the thing that fluctuates is the value of treasury notes, and as the value of these depends upon the quantity in circulation, no person can exert any material influence upon this value except the man who has control of the issue of the notes, and that man is the Secretary of the Treasury. If William Pitt Fessenden decides to increase the circulation of treasury notes, the value of the notes will fall, in other words, gold will rise; but if he decides to retire a portion of these notes from circulation, their value will increase, or gold will fall. Military successes or disasters, or the combinations of brokers have but a temporary influence upon the price of gold.

HOMES FOR MEN OF MODERATE MEANS.

An acknowledged want in this and other large cities has been neat, commodious and convenient dwelling houses which could be rented at reasonable prices promptly paid. The want still exists, though it has been partly met by the erection of blocks of buildings in the upper part of the city which are leased in separate floors or suites, as tenants desire. These houses are intended for gentlemen's families, or at all events persons having a realizing sense of not merely the proprieties of life but the refinements of it, and who take good care of the landlord's property.

The plan of these houses is very good, but it might be much better. In general but one floor is rented, and each one is perfect in all that affects comfort and economy. Gas is laid, and water is abundant in nearly every apartment; there is in most of these dwellings a bath-room on each floor, also sinks, closets and clothes-presses. It must be borne in mind, however, that these accommodations are rather limited as to space; the largest rooms being not over 18 feet by 12, and less, and in some of the houses there are too many dark bed-rooms. Still, in their essential features, these dwellings are a great improvement on the old plans of hiring out ordinary houses to different families where no accommodations of the kind alluded to exist.

In these new houses there are some minor evils which could be remedied, and that is the necessity which now exists for carrying all household supplies in and out the principal entrance, and also the waste which accumulates from time to time. The walls are not as substantial as they should be, neither are the floors strong enough. In too many instances the neighboring houses are the only support of these shells, and of a long row the pressure on the end building is so great that in a few years it becomes unsafe to live in.

It would be far better to omit the thin veneer of brown stone with which the front of the house is coated and expend the same sum in more substantial and necessary details. With some, however, a brown-stone front has become a synonym for respectability. Some people would sooner live in one at the risk of their lives than put up with the more unpretending externals.

It is a great step in advance to have even these houses; they are an improvement on that system of crowding families into narrow and inconvenient quarters, not designed for such purposes.

ARE HURRICANES CAUSED BY METEORS?

Among the most mysterious actions of the atmosphere are those blasts of wind that sometimes rush along in narrow paths with terrific violence for a moderate period of time and for a moderate distance. May not these be caused by the passage of meteoric stones through the air?

The great meteor which passed over this city on the 20th of July, 1860, was seen at Elmira at five minutes before 9 o'clock in the evening; a fraction of a minute later it flashed over this city; and in a few seconds it was lighting up the east end of Long Island, 90 miles away. It is supposed that the heat of these bodies is caused by the destruction of their motion from the resistance of the air, and that large numbers of them are so highly heated as not only to be melted, but to be evaporated, when they would of course be dissipated in the atmosphere. Would not one of these bodies, rushing at such immense velocity through the air, necessarily produce a narrow and violent blast of wind along its track, conforming in all respects to the singular hurricanes that so frequently occur?

If the earth should be stopped in its orbit, it would begin to fall straight towards the sun. As it approached more nearly to that great source of heat it would soon reach a point where the temperature is as high as 212°, and then all of the waters of the ocean would be evaporated. As it drew still nearer, the rocks would be melted, and afterwards they also would be evaporated. Before it reached the sun, this solid earth would be converted into a vast volume of red hot gas, which, when it fell into the fiery atmosphere of the sun, would merely produce blasts of wind from the point where it struck outward in all directions.

DISCOVERY OF AN ANCIENT ROMAN DRAINING WHEEL.

M. Andre Sanson gives a description in the Paris *Presse* of the discovery in one of the mines of Portugal of an old wheel which was doubtless employed by the Romans to raise water in the operation of draining the mine. It is well known that the hydraulic works of the Romans surpassed in extent any of those of modern times. As that great people had not the use of either steel or gunpowder, they were sometimes obliged to raise water over a ledge where modern engineers would carry it right through. In some of the mines of San Domingos they dug draining galleries nearly three miles in length, but in some places the water was raised by wheels to carry it over rocks that crossed the drift. Eight of these wheels have recently been discovered by the miners who are now working the same old mines. These wheels are made of wood, the arms and felloes of pine, and the axle and its support of oak, the fabric being remarkable for the lightness of its construction. It is supposed that these wheels cannot be less than 1,450 years old, and the wood is in a perfect state of preservation, owing to its immersion in water charged with the salts of copper and iron. From their position and construction these wheels are presumed to have been worked as tread-mills by men standing with naked feet upon one side. The water was raised by one wheel into a basin, from which it was elevated another stage by the second wheel, and so on for eight stages. The wheel described by M. Sanson is on exhibition at the Academy of Arts and Trades. It is 21 feet 7 inches in diameter, and 19 inches across the face.

Explosion of a Lime-light Apparatus.

At a political meeting in this city, on Thursday evening, Sept. 8th, among the attractions a lime-light was exhibted, and soon after the light was kindled a portion of the apparatus exploded, seriously wounding two women, one of whom has since died. The light was prepared by Mr. Robert Grant, and in his testimony he states that the cylinder which exploded contained pure oxygen with a mixture of one-twelfth part by measure of illuminating gas, compressed by a force of 15 atmospheres, or 200 pounds to the square inch. In taking the apparatus to the ground the jet pipe was bent so as to expose it more than usual to the heat, and in this way the explosive mixture was set on fire.

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ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING SEPTEMBER 13, 1864.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other intormation useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

44,148.—Straw Cutter.—Andrew J. Adams, Climax Prairie, Mich.:

I claim the pressure plate, M, arranged with the upper feed-roller, L, and springs, O, to operate in the manner as and for the purpose set forth.

[This invention relates to a new and improved machine for cutting straw, hay, stalks, etc., for fodder, and it consists in the means employed for operating the knife and feeding device, and also in an improved means for clamping the substance to be cut, or compressing it so that the knife or cutter may act in the most favorable and efficient manner.]

44,149.—Improved Molding Apparatus.—Stephen Ashford, Philadelphia, Pa.:

First, I claim constructing the plate, E, in halves, and then connecting the halves together, as above described, so as to make the holes in one-half thereof, which fit on the pedestals, a b, correspond with the holes in the other half, in shape, size and position.

Second, Constructing the relief plate, E, with dowels in one edge and corresponding holes in the other, which correspond in one respect to the arrangement of the dowels and holes in each half of the flask, substantially as represented, so that the latter are thereby separately connected with the relief plate for the operation of molding and conjointly with each to unite the mold, by the same means as above described.

44,150.—Improved Grain Dryer.—John Babillion, Detroit, Mich.:

First, I claim the hot-air chamber surrounding the flue of the furnace, and supplied with side passages, S, and valve, V, in combination with the sectional trays, A A, constructed and operating substantially as described.

Second, I claim suspending each leaf of the trays, A A, upon separate rods, e, on which they vibrate, substantially as described.

[This invention consists in improvements upon a previous patent, granted March 3, 1863, by which the sectional trays are operated independently of each other, and the flue of the drying furnace is made to pass through a hot-air chamber, which communicates by valves with the drying chamber.]

44,151.—Improvement in Apparatus for Steaming Grain.—Allen S. Ballard and Thomas L. Sergent, Mount Pleasant, Iowa:

We claim steaming grain, for the purposes specified, by means of drum, A, hoppers B and D, valves, C and E, steam pipe, F, and waste pipes, G and H, constructed and operating substantially as set forth.

44,152.—Improved Tile Machine.—Saml. M. Bartlett, La Salle, Mich.:

I claim, first, The employment or use in a machine for making tiles, of chains, K K, or other equivalent flexible pitmen for actuating the plunger, G, substantially as set forth.

Second, The clam, L, in combination with the cut-off, F, when arranged in relation with the issues, h h, substantially as shown and described, to admit of said issue being alternately opened and closed at the proper time, and also to admit of the clay being discharged from the packing boxes, directly under the issues, and thereby limit or shorten the movement of the plunger, G, as set forth.

Third, Attaching the chains or flexible pitmen, K K, to the end pieces, b b, of the plunger, by means of the screw rods, e e, and nuts, f f, to admit of the ventilation of the packing boxes, as specified.

[This invention relates to a new and improved machine for manufacturing tiles, and it consists in an improved means for operating the plunger and cut-offs, whereby several advantages are obtained over the tile machine now in use, as herein specified.

44,153.—Improvement in Steam Generators.—Oliver W. Bagley, Boston, Mass.:

I claim passing one or more columns of heated mercury through a tube or tubes, suitably arranged to establish the required circulation, and led through the furnace and the water in the boiler, substantially as set forth, for the purpose specified.

44,154.—Improved Canal-boat Tow-line Attachment.—Charles Bentz, Mindenville, N. Y.:

I claim the construction and combined arrangement of the swing bar, the tumbler, and the lever, for the purpose of forming a whiffle tree hook, for tow-lines, or other purposes, the whole operating together in the manner and for the purpose, substantially as described.

44,155.—Improvement in Air Valves for Steam Radiators.—George W. Blake, New-York, N. Y.:

I claim the combination of the brass or composition rod to which the valve is attached, or on which it is formed directly, with one of the iron tubes of a tubular radiator, or to any part of the interior of the shell of any other kind of radiator, substantially as and for the purpose herein specified.

[This invention consists in the employment within one of the iron tubes of the tubular radiator, or within the shell of any other radiator, of a brass or composition metal rod, secured at one end to the tube or shell, and having at the other end a valve fitted to a stationary seat, whereby the difference of expansion under changes of temperature between the brass, or composition of which the bar is composed, and the iron of which the tube or shell is composed is caused to leave the valve open until the radiator is full of steam, and then to close it.]

44,156.—Improved Steam-Heating Radiator.—George W. Blake, New York, N. Y.:

I claim, first, The combination of the two-chambered box, A, the tubes, C C, closed at one end open at the other, and the tubes, E E', open at both ends, the whole arranged substantially as herein specified.

Second, The return tube, E, forming a communication between the lower part of the collecting chamber, c, through the lower steam tube, C, and the chamber, b, of the two-chambered box, A, to permit the return of the water of condensation from the said collecting chamber to the boiler, through the steam inlet-pipe, substantially as herein described.

[This invention consists in a radiator composed of a series of steam tubes, closed at one end and open at the other, having their open ends connected with one of the chambers of a two-chambered steam box, with which the steam inlet-pipe is connected, and having arranged within them a series of smaller tubes, which are open at both ends, and connected at one end with the other chamber of the steam box, which may be termed the collection chamber, for the purpose of permitting the escape into the latter chamber of any air that may have entered the first-mentioned tubes before the admission of steam thereinto, and of the water which is formed by condensation; the said collection chamber being provided with suitable means of egress for such air and water.]

44,157.—Improved Coal and Ash Sifter.—E. S. Boynton, Hartford, Conn.:

I claim a spirally-formed open wire sieve or cylinder, for sifting coal and other substances, substantially as shown and described.

I also claim the spirally-formed open sieve, in combination with a vibrating hopper, B, and ash-box, C, substantially as and for the purpose described.

44,158.—Improved Regulating Apparatus for Steam Heater.—John Briggs, Roxbury, Mass.:

I claim the combination of one or more expansive drums, t m n o, and a steam coil or heater, A, by means not only of a leading pipe, B, furnished with a stop-cock, D, but of a wheel, E, a chain, F, counter weight, G, and lever, H, the whole being arranged and applied together, substantially as hereinbefore specified.

I also claim the construction of either of the expansion drums, with tubes running into it or transversely through it, from one part of its periphery to another or opposite part thereof, and being open so as to allow air to flow freely through them, as described.

44,159.—Improvement in Links for Steam Engines.—Francis A. Brown, Ithica, N. Y.:

I claim a solid bar link, A, provided with a valve rod-block, B, composed of plates, c g g, and adjustable lugs, d d, connected by screw bolts, e, all arranged as and for the purpose specified.

44,160.—Improved Scrubber.—Melbourne C. Burr, New Albany, Ind.:

I claim, as an improved article of manufacture, a scrubber, provided with a strip of india-rubber, secured to it in the manner substantially as herein set forth.

[This invention consists in a novel and approved manner of applying india-rubber to the head of the scrubber, whereby the scrubber is rendered far more efficient than hitherto, as herein set forth.]

44,161.—Improvement in Watches.—Merritt Burt, Cleveland, Ohio:

I claim the revolving friction pinion, D, when constructed, arranged and operating as and for the purpose herein specified.

44,162.—Improved Furnace for Clarifying Cider, &c.—Christopher Cory, Lima, Ind:

I claim the formation of furnaces for clarifying or condensing the juices of apples and other fruits, and also saccharine fluids, with one or more of the upper strata of their side walls, made of gypsum calcined, or otherwise, or of other inferior or non-conducting materials, by which the excess of heat to the sides of the pan by contact with the walls of said furnace is prevented, substantially as and for the purposes herein set forth.

44,163.—Fitting Shoe Uppers.—John Cowles, Rochester, N. Y.:

First, I claim the combination of the vamps quarters and lining, when sewn and cemented, substantially in the manner and for the purpose set forth.

Second, In combination with vamps and quarters united as described, the joining the fronts of the lining, and causing them to cohere with cement, as and for the purpose set forth.

44,164.—Improvement in Stop-cocks.—Gustavus Cuppers, New York, N. Y.:

I claim, in combination with the revolving valve stem, D, the stationary swivel valve, f, substantially as and for the purpose described.

I also claim, in combination with the stationary swivel valve, f, the facing, p, made of compressible material, constructed and operated substantially in the manner and for the purposes described.

44,165.—Improved Tub-washing Machine.—John Danner, Canton, Ohio:

I claim, in combination with a tub-washing machine, a cover for supporting, guiding or admitting the rubbing board stem or shaft to pass through, said cover being in three sections, two of which shall be hinged and the third rigid, and so that the rubbing board will swing upward and backward with one of said sections, substantially as and for the purpose described.

44,166.—Portable Drying Stove.—James David, Beech Creek, Pa.:

I claim, first, The inclined plate, B, for the purpose of correspondingly inclining the vessel placed thereon, as and for the purpose described.

I also claim, in combination with the deep basket-shaped grate or fire-box, and the passages over and underneath it, the dampers, b c d, plate, f, and opening, e, for turning the density of the fire toward or from the evaporating or drying vessel, substantially as and for the purposes described.

44,167.—Improved Bedstead Fastening.—Justus Doering, Philadelphia, Pa.:

I claim the plate, D, with its projection, d, and the plate, D', with its depression or recess, when the said projection and recess are formed and adapted to each other, as and for the purpose set forth.

44,168.—Improvement in Animal Trap.—U. H. Duparik, Albion, Mich.:

I claim the attachment of the "tipping board," C, to the "lever," D, by which the weight of the animal on the "tipping board," C, as he passes into the third compartment, raises the "drop door," A, and hooks the pin, K, on "lever," D, over the "spring trigger," H, attached to "treadle," B, and thus sets the trap.

44,169.—Catch for a Photographic Plate-holder.—H. C. Eddy, Jersey City, N. J.:

I claim the double catch, C, consisting of two spring jaws, b b, and operating in combination with the conical-headed stud, e, and hinged lid, B, in the manner and for the purpose substantially as herein shown and described.

[The object of this invention is to arrange the catch so that it will hold without fail, and perfectly receive the lid of the plate-holder.]

44,170.—Improvement in Radiating Heat Regulator.—Alfred Edwards, Chicago, Ill.:

I claim, first, The chamber, B, provided with the plate, C, when arranged in the pipe, A, substantially as and for the purposes set forth.

Second, The combination and arrangement of the chamber, B, the plate, C, the pipe, A, and damper, E, constructed and operating substantially as and for the purposes herein described.

44,171.—Clipping the Hair of Horses.—George F. Evans, Norway, Maine:

I claim my improved horse-clipper or shearer, as made with the stationary and rotary shears, D E, and with the gears, H I, and cranked shaft, F, arranged and so as to operate together, substantially as specified.

Also, the combination of the same and the wheel, L, the line, M, the ratchet, S, the spring pawl, R, and the spring, O, for operating the shaft, F, as described.

44,172.—Improved Device for Shrinking Tire.—James Ferris and Wm. E. Bacon, Litchfield, Ill.:

First, I claim the stationary and sliding bed, A C, in combination with the dogs, B D, and the concave upper surface of the bed, C, all constructed and arranged, substantially as and for the purpose specified.

Second, The lever, A, provided with the shaft, G, and eccentric pinion, F, in combination with the rack, E, and the right-angled straps, I I, attached to the beds, A C, and all arranged, substantially as shown, by operating the bed, C.

[This invention relates to a new and improved device for shrinking ties for wheels, in order to avoid the trouble and expense of cutting and rewelding the ties in case of the shrinking of the wheels.]

44,173.—Improvement in Whiffletree Hooks.—Jeremiah Fink, Baldwinsville, N. Y.:

I claim the link or ring, a, forming a broad bearing, to prevent the passage of the cleves or trace eye, when inserted in place, and jointed to the point, b, of the hook, and resting against the shank, in combination with said hook; the whole arranged and operating substantially as herein specified.

44,174.—Improvement in Street-sweeping and Sprinkling Machines.—D. D. Foley, Washington, D. C.:

I claim the construction of a street-sprinkling and sweeping machine, when combining the frame, E, endless belt, D, revolving brush, C, and lever, H, with the water tank, A, and sprinkler, B, substantially as described.

44,175.—Improved Camp Cooking Stove.—Obed Foote, Indianapolis, Ind.:

I claim the arrangement of the stove with sliding or portable bottom plate, operating in the groove, F, and sliding front or door, the whole being combined with the reflectors, G and H, having the window, R, and cap, Q, and the hinged leg or foot, K, in the manner and for the purposes set forth.

44,176.—Skates.—O. C. Forsyth, Jr., Washington, D. C.:

I claim, first, The combination of an elastic sole, with two or more runners, which are free to rotate in the direction of the length of the skate, substantially as described.

Second, Adjusting the skate for different sizes of feet, and to different degrees of steadiness or rigidity, by means of holes, 3, in the sole and sectional runners, substantially as described.

Third, I claim in the construction of skates connecting the runner or runners to the body of the skate, so that each shall be capable of rotating on its separate axis, independently of the sole or body, substantially as described.

Fourth, Holding the runner or runners of skates, which are made capable of rotating independently of the movement of the body of the skate, in their proper horizontal position, by means of springs interposed between their moving ends and the sole of the skate, substantially as described.

44,177.—Improved Cane Juice Evaporator.—F. C. Fulgham, Arba, Ind.:

First, I claim the bars or ledges, e, in combination with the inclined sides or shores b, when constructed and arranged, substantially in the manner herein represented, and for the purpose described.

Second, I claim forming the bottom with a central depression, as represented by shade lines, a', extending through a greater portion of the length of the pan, in combination with a flat or level portion, a, as herein shown and described.

Third, In combination with pan, B, and furnace, A, I claim the construction and arrangement of lever, f, fulcrum, q, pin, k, and strips, l, as herein shown, and for the purpose described.

44,178.—Improved Composition for Painting.—J. Lewis Geroldsex, Livingston, N. Y.:

I claim the composition of matter, together with the process of compounding or making the same, substantially as set forth in the above specification.

44,179.—Churn.—Abram J. Gibson, Worcester, Mass.:

I claim a churn dasher, which fits accurately inside of a straight cylindrical barrel the holes, B B B B, placed at opposite angles, as and for the purpose specified, in combination with tubular rod, C, and valve, D, as set forth.

44,180.—Improvement in Outside Flues and Dampers for Heating Stoves.—Henry G. Giles, Troy, N. Y.:

First, I claim in a stove which has both a chamber of combustion and supply, the flues, J and L, projecting partly or wholly outward from the regular or proper line of the casing of the stove, operating as and for the purposes described.

Second, I also claim in the same kind of stove, in combination with said flues, J and L, the damper, R, or any opening to said flues admitting exterior air to either of them, for the purpose set forth.

Third, I claim, also, in the same kind of stove, in combination with said flues, J and L, the damper, N, operating as and for the purposes set forth.

Fourth, I claim the double-acting damper, W, which at the same time closes off the product of combination, from one of said flues, and turns the other downward.

Fifth, I claim the suspended flue division, or equivalent, acting as a damper for changing the course of the draught, as described.

44,181.—Improvement in Motive Power.—James Green, Providence, R. I.:

I claim, first, The radially-sliding rolling weight, D, attached to the sides of the wheel, A, and operating in combination with the cams, E F F' substantially in the manner and for the purpose herein specified.

Second, The combination of the cams, F F', carriages, G G', cam, E, and circular shoes, p, constructed and operating substantially as and for the purpose set forth.

[This invention consists in a series of radically sliding rolling weights attached to sides of a wheel in combination with stationary cams in such a manner that by the action of the cams said weights are always held in such a position towards the wheel that the weights on one side overbalance those on the other, and consequently a continuous rotary motion of the wheel will be effected, it consists also in the use of a double set of adjustable cams in combination with the sliding weights and revolving wheel in such a manner that by moving the outer cams on a carriage in a radial and the inner cams in suitable guides in a circular direction, the motion of the wheel can be readily reversed whenever it may be desired.]

44,182.—Improvement in Fastening for Chimney-cap Plates.—Wm. Griffiths, Philadelphia, Pa.:

I claim securing the cap-plate of a chimney, by means of adjustable legs or binders, b, constructed and applied so as to operate substantially in the mode described, for the purposes specified.

44,183.—Improvement in Reservoir Stoves.—H. F. T. Hale, Milwaukee, Wis.:

I claim, first, The combination of the open chamber, O', surrounding the fuel reservoir, with the hollow vertical grate bars of the fire-pot, substantially as shown.

Second, I also claim the combination of the hollow vertical grate bars, the annular chamber, O', and the air chamber, C', with its range of small pipes, c, substantially as shown.

Third, I also claim the combination of the hollow-vertical gate bars, with the flues, Q D D and E, substantially as shown.

Fourth, I further claim the flat air chambers, x, for supplying the front vertical grate bars of the fire-pot, substantially in the manner and for the purpose herein shown and described.

[This invention consists in an attempt to make a more economical use of the products of combustion than can be made in the stoves in common use.

44,184.—Improved Bottle Stopper.—Wm. Henry Hall, New York, N. Y.:

I claim the use of the flanged discharge tube, C, with screwed cap, D, in combination with an ordinary stopple, B, applied and operating substantially as and for the purpose set forth.

[This invention consists in the use of a flanged discharge tube, which is secured in an ordinary stopple, by screwing, or in any other suitable manner, and which is provided with a screw cap in such a manner that by removing the screw cap the contents of the bottle or vial can be poured out in small or large quantities, without removing the stopple, and the liquid is prevented from adhering to the upper edge of the discharge tube, and running over the sides of the bottle or vial, which it is liable to do, in pouring liquid from the neck of the bottle or vial, and by replacing the cap the bottle or vial is firmly and hermetically closed.]

44,185.—Cart Harness.—Emory E. Hardy, New York, N. Y.:

I claim, first, The shell, A, of such form as to adapt it to the animal's back, and provided with the flanges or ribs, h h, forming the recesses, a a, and the central channel, as shown, and having its under surface smooth and free from projections.

Second, Providing the central channel with the screw sockets, e, by casting the same therein, as shown.

Third, I claim filling the channel or recesses, a, by blocks of wood or other suitable material, to form a smooth surface or top, substantially as shown.

Fourth, I claim the bridge-piece, B, when made, substantially as shown, and used in combination with shell, A.

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Fifth, I claim attaching the bridge piece, B, to A, by means of the pins, d, or by the flanges, c, as shown.

Sixth, I claim the terrets, o o, and check and check hook, p, in combination with bridge-piece, B, as shown and described.

44,186.—Improvement in Machine for Weaving Loom Harness.—George W. Harris, Lowell, Mass., and Wm. R. Harris, Manchester, England. Patented in England Dec. 24, 1858.

We claim, first, Machinery for supporting the back bands, and moving them in the or er required for the operation of the shuttles.

Second, Mechanism for operating the two twines for forming the "light" and "hard" halves of the harness, and either with or without the eyes, substantially as herein-before specified.

Third, Mechanism, or means of encircling the back bands with fastening twines, and knitting or securing to the said back bands the said fastening twines, and certain other twines, carried and operated by shuttles or their mechanical equivalents.

We also claim the combination of the said automatic machine and machines, for interweaving with the light half of the harness a "bear" string or "tokening thread," the whole being substantially as described.

We also claim the combination of the said automatic machine and a mechanism for arresting its motions, whenever any one of the twines of the shuttle-spools may break or a shuttle-spool may have its entire twine run from it and require to be replenished with more.

We also claim the combination of the said automatic machine and mechanism, by which the machine will not only be caused to continue its operation until an entire harness may have been made by it, but will have its shuttles stopped in their action, so as to enable the backbands to be drawn through the machine the necessary distance for the commencement of another harness, the shuttles being next thrown into operation for the production of this last-mentioned harness.

And we also claim the combination of the same, and a mechanism for drawing the backbands through the machine the necessary distance for the commencement of another harness.

We also claim the combination of the said automatic machine, and a mechanism, by which its entire operation may be arrested on the completion of a harness.

We also claim the improved machine, as not only provided with a shuttle-frame, g, movable substantially as described, and carrying the shuttles, and moving them in directions longitudinally of the machine and with respect to the backbands, in the manner as explained, but as having its backbands supported and operated, substantially as specified.

We also claim the combination of the twines, Y'' Y'', or their mechanical equivalents, with harness-making mechanism, substantially as described. We also claim the combination of the stationary center piece, k', with one or more shuttles, to be operated substantially as described, the purpose of the said fixed center piece being herein before specified.

We also claim the combination of the vibrating fingers, h' h'', with the stationary center piece, k', and one or more shuttles, operated or to operate substantially as described.

We also claim the combination of the vibrating guide needle or finger, f, with the vibrating fingers, h' h'', the stationary center point, k', and one or more shuttles, operated or to operate substantially as specified.

We also claim the construction of the machine, substantially as described, to form the leash of the harness, it being accomplished by giving to the cam shafts, H and H', but half a revolution, during the formation of each successive needle, in manner and by means as specified,

44,187.—Machine for Cutting Lacings.—Hosea B. Harvey, Northbridge, Mass.:

I claim the within-described machine for cutting strips, constructed and arranged substantially as specified.

44,189.—Improvement in Stove Grates.—David Hathaway, Troy, N. Y.:

I claim the combination of the revolving, oscillating key, F, with the tilting frame, N as held in connection by the loop p, constructed and arrange as described and represented, for the purpose set forth.

44,189.—Improved Composition for Dressing Millstones.—William H. Hayes, Rock Island, Ill.:

I claim the use for dressing millstones, of a composition made of the ingredients above specified, and mixed together, in about the proportion and in substantially the manner set forth.

[Millstones when dressed in the ordinary way will soon be covered with gum and glazing on their surface, and their quality to cut and grind is thereby materially impaired; the fine furrows are completely blocked up, and the stone has to be redressed at great expense and loss of time. The object of this invention is to obviate this difficulty, and to remove the glazing and gum from the surface of millstones.]

44,190.—Implement for Perforating and Sewing Paper. Albert H. Hook, New York, N. Y.:

I claim the circular cutter implement, composed of a cutter or operator, a, and handle, b, and for the purposes set forth.

I also claim, in combination therewith the shield, c, as herein specified.

44,191.—Adjustable Gang Punch.—Charles E. Howard, West Bridgewater, Mass.:

I claim a series of solid punches, with their dies to match, when connected and operating together, so as to punch a series of holes in curves or straight lines, at various distances, the whole constructed and arranged in the manner specified and in combination, as herein described.

44,192.—Improvement in Harvesters.—Moses G. Hubbard, Syracuse, N. Y.:

I claim the combination of the bar, F, and the sliding joint, K, at its rear, end, with the rod, R, and the rod, G, substantially as and for the purposes set forth.

I also claim the combination of the raising handle, E, with the cam, L, or its equivalent, when constructed and arranged, substantially as specified.

I also claim the extension, of the coupling rod, G, constructed and attached, substantially as and for the purposes described.

44,193.—Improvement in the Cutting Apparatus of Mowing Machines.—Moses G. Hubbard. Syracuse, N. Y.:

I claim, first, Constructing the head by which the pitman is connected with the cutter bar by two ears, which form the hinge, one of which ears is located upon the dumb cutter or projection in front, the shank being tapering so as to be attached to the cutter bar, all formed and arranged as herein specified.

Second, I claim the vertical projection, I, in combination with the pin, L, for the purposes set forth.

Third, I claim forming the divider, Fig. 3, substantially as described, consisting of an outline of hexagonal form gradually tapering to a point, on a line with the cutter, and having a shoulder and shank, by which I form a divider of simple and construction, as and for the purposes set forth.

Fourth, I claim introducing a cushion between the vibrating steel parts of the cutting bar and pitman of a harvester, specifically as and for the purpose described.

44,194.—Improvement in the Construction of Ordnance.—William Wheeler Hubbell, Philadelphia, Pa.:

I claim, first, Casting the bronze with solid breech and barrel in a solid body around the solid breech, of wrought-iron or steel, and the barrel united in one piece, in the form and proportions set forth, to combine the extreme strength and other advantage of both these metals, as described.

Second, Shrinking or securing the one wrought-iron or steel band upon the bronze breech surrounding the solid wrought-iron or steel breech and barrel, so as to clasp the bronze between the wrought-iron or steel of the band and the wrought-iron or steel of the breech, and more solidly, in combination from the breech to the trunnions, substantially in the manner and for the purpose described,

44,195.—Improvement in Water-Wheel Scrolls.—J. E. Houston. Hillsdale, Mich.:

I claim, first, The combination of the adjustable scroll, b, with the stationary shell, a, substantially in the manner and for the purpose herein set forth.

Second, The movable slide, c', in combination with the adjustable scroll, b, and lip, a*, of the shell, a, applied and operating in the manner and for the purpose substantially as herein shown and described.

Third, The guides, c3 d d', and corresponding slots, c4 d* d*, in combination with the chute and scroll, b, and with the top and bottom shell of the stationary shell, a, constructed and operating substantially as and for the purpose herein set forth.

[This invention consists in the application to an ordinary central discharge water-wheel a stationary shell and adjustable interior scroll, in such a manner that the amount of water used on the wheel may be regulated so as to have a solid spout of water in all cases, whatever the amount of water used on the wheel, either by hand or with a governor, and without any waste of water.]

44,196.—Improved Ventilator.—John Hyslop, New York, N. Y.:

I claim, first, A ventilator, divided by a partition or diaphragm, in combination with side louvres of any desired form, and with or without the bottom louvres, substantially as described.

Second, A ventilator divided into two or more compartments, in combination with the side louvres, C, constructed as described and either with or without the bottom louvres, D, as set forth.

[This invention consists in constructing the ventilator with louvres at its sides, and with partitions, one or more, and also with bottom louvres or an equivalent device; all arranged in such a manner that due provision is made for the ingress and egress of the air and a current allowed to pass through the compartments of a building, the invention being applicable to building of any number of stories.]

44,197.—Improvement in Heat-Radiator Attachment.—Jacob B. Hyzer, Janesville, Wis.:

I claim, first, The combination of an outside radiating case within an inside radiating cylinder, with stationary radial and radiating plates, arranged as described, and combined with the dampers to secure an upward, direct, full, or reduced draft, when used, substantially in the manner herein set forth and described.

Second, The application and combination of ascending and descending hot air flues, regulated by dampers, as described, to form a heat radiator, for the purpose of radiating heat generated from any source, and introduced into the radiator in any manner and for the purposes set forth and described.

44,198.—Improvement in Vacuum Apparatus for Treating Disease.—Alfred F. Jones, Lexington, Ky.:

I claim an apparatus for the treatment of disease, consisting of a receptacle, A, which is capable of being made air-tight, an air pump, B, and a registering apparatus or gage for determining the pressure of air upon the person partially inclosed within said receptacle, substantially as described.

44,199.—Sorghum Evaporator.—Joseph E. Kendall, Plymouth, Ind.:

I claim, first, The rotating boiler or pan, constructed in the manner described, which rotates entirely around from right to left, or left to right, at the will of the operator, while the whole fire surface is continually exposed to the heat if desired.

Second, The arrangement of the flues and valves, and the formation of the circular and spiral flues in the air chambers, as in the drawings shown.

Third, The manner of constructing the wire brush and the particular application of the same, for preventing the formation of crust on the bottom and sides of the boiler, as shown in the drawings.

Fourth, The manner of holding up, supporting, and connecting the fire-box, air-chambers, and boilers, by the wood and iron frame work and flues, as described and shown in the specifications and drawings.

Fifth, The particular arrangement and combination of the fire-box, air-chambers, boilers, flues, valves and gearings or their equivalents, and the manner of constructing the same in the manner and for the purpose set forth in the drawings and in the above specifications, so as to make one complete machine.

44,200.—Washing Machine.—A. K. Kent, Owatonno, Minn.:

I claim the concave, C, composed of a series of alternate bars, d, and slats, e, the former being covered with zinc, f, and the bars and slats fitted at their ends in semi-circular grooves, c, made in the inner surfaces of the sides, b b, of the suds box, in combination with a rubber, D, provided with slats, k, with or without a zinc covering, l, substantially as and for the purpose set forth.

[This invention relates to a new and improved clothes-washing machine of that class in which an oscillating rubber and a stationary concave are used, and it consists in a novel manner of constructing the concave; to-wit, with projections covered with zinc, and also in covering the projections of the rubber with zinc and employing metal bearings for the journals of the rubber, whereby an exceedingly durable machine is obtained, and one which will not be liable to wear or injure the clothes.]

44,201.—Water Wheel.—John J. Kimball, Naperville, Ill. Ante-dated April 15, 1864:

I claim, first, The wheel, B, provided with two sets of buckets, a b, the former a, being straight and at the lower part of the wheel and having a radial position and the buckets, b, being curved and directly over the buckets, a, in connection with the scroll, A, extending upward so as to enclose the lower buckets, a, of the wheel, substantially as and for the purpose set forth.

Second, Operating the cylindrical gate, F, through the medium of the rods, d, plates, G H, pulleys, f f', cords or chains, e, plate, I, rods, g, collar or oil cup, J, and the rod, K, and nut, m, or their equivalents all arranged as set forth.

[This invention relates to certain improvements in that class of water wheels which are placed on vertical shafts, and are commonly termed horizontal water wheels. The invention consists in a novel construction of the wheel, the same being provided with two sets of buckets, one set being straight and having a radial position in the wheel, and the other set being curved, and using in connection with the wheel thus constructed a scroll peculiarly arranged and a gate operated in a novel way, whereby it is believed that several advantages are obtained over the ordinary horizontal wheels in use.]

44,202.—Carpet Bag.—Samuel Lagowitz, Newark, N. J.:

I claim the metal corners, A, in combination with the center piece, C, and ends, B, applied in the manufacture of frames for carpet bags, etc., substantially in the manner and for the purpose herein shown and described.

[This invention consists in the use of iron or metal corners in combination with ends and a center piece made of wood or other suitable material, in the manufacture of frames for carpet bags, etc., in such a manner that the difficult and tiresome operation of bending the wood or iron can be dispensed with, and the corners can be easily and cheaply made by casting them or by stamping or cutting them out of sheet-metal.]

44,203.—Machine for Pegging Boots and Shoes.—Wm. R. Landfear, Hartford, Conn.:

I claim the employment of the feed-roll or sleeve, E, with the bolt or stud, F, in connection with the peg-driver and awl, substantially as and for the purpose described.

44,204.—Washing Machine.—George W. Linn, Lee Center, Ill.:

I claim the combination and arrangement of the adjustable and changeable arms, H, with the holes, a a, of the shaft, C, and used in connection with the tub, A, substantially in the manner and for the purpose herein set forth.

44,205.—Sheep Rack.—David Lippy, Mansfield, Ohio:

I claim the stationary racks, D D, provided with the adjustable or sliding racks, G G, in combination with the troughs, C C, and the central compartment provided with the adjustable bottom boards, d d, all arranged substantially as shown to form a new and improved sheep rack, as set forth.

[This invention relates to a new and improved rack for holding fodder for sheep while the latter are feeding. The object of the invention is to obtain a rack for the purpose specified, which will not admit of the food being wasted by the sheep, and which will admit of the latter eating with ease and comfort and at the same time fully protected from the weather.]

44,206.—Gang Plow.—Thomas R. Markillie, Winchester, Ill.:

I claim, first, Hinging or pivoting the plow beams, E E', to the frame beams, B B, on both sides of the axle, A, by means of arms, g g', and arranging the plow beams so that they will extend out on each side of the axle-tree to receive the forward and rear plows, substantially as described.

Second, The lever, G, and arm, h, and pin, f, in combination with hinged beams, E E', constructed and operating substantially as and for the purposes described.

Third, The adjustable brackets, t t, arranged on the frame beams, B, in combination with the hinged beams, E E', substantially as and for the purposes described.

Fourth, The adjustable vertical guide plate, b, on the axle-tree, A, adapted to receive a slot in the rear end of the pivoted draft-pole, C', substantially as and for the purposes described.

Fifth, The combination of bent lever, D, perforated check plate, D', and guide-plate, b, with the pivoted draft-pole, C', and frame beams, B B, arranged and operating substantially as and for the purposes described.

44,207.—Lock.—Walter K. Marvin, New York City:

I claim, first, The method of adjusting the central disk revolving tumblers of permutation locks in relation to the outer wheel or surrounding flange thereof, by means of a stop actuated by a spring-lever or otherwise on the flange part, in combination with a series of holes on the periphery of the central disk, arranged for operation as described so as to allow of the adjustment being effected by a locking device acting from without on the circumference towards the center of the wheel, substantially as herein set forth.

Second, In combination with a central disk, I claim a double-flanged rim to securely and permanently hold and confine the edge of the disk, substantially as set forth.

Third, In combination with a central disk, double-flanged rim and locking pin under the arrangement described, I claim orifices through the flanges of the tumblers, so that by the insertion of a wedge pin through said orifices the locking pin will be raised out of the hole in the central disk, thus disengage the disk from its flanged outer wheel and allow it to freely revolve within it, substantially as herein set forth.

Fourth, Providing the dial of permutation locks with adjustable indicators sensitive to the touch, so that the letters or numbers of the key being marked on the dial the lock may be opened without seeing it, substantially as set forth.

Fifth, In combination with a revolving tumbler fast on the spindle and provided with false notches as described, I claim a dog enlarged at the part corresponding to the said tumbler so that the dial shall be locked as soon as the bolt is attempted to be withdrawn.

44,208.—Heating Stove.—James L. Wilson, Chicago, Ill.:

I claim, first, The arrangement of the fire-box, A, pipe, B, branches, g and h, valve, n, heat chambers, C and E, columns, D, cold air chambers, X, with the openings, 3 and f, the whole be ngconstructed, arranged and operating substantially as herein described and for the purpose set forth.

Second, Placing under the fire-box of stoves, a heat chamber surrounded by a cold air chamber, said heat chamber being connected with a flue or flues, and the fire-box of the stove, as herein described and for the purpose set forth.

44,209.—Mode of Treating Vegetable Substance for the Manufacture of Paper Pulp, etc.—Harrison B. Meech, Fort Edward, N. Y.:

I claim the use of a stationary boiler constructed substantially as above described, in combination with a boiling liquor including grease, oil or soap, constituted substantially as above described, and a high temperature ranging from that indicated by an internal pressure in the boiler of 60 pounds to the square inch to that indicated by the like pressure of 150 pounds to the square inch, in the manner substantially and for the purpose above described.

I claim broadly the combination of a stationary boiler with the use of the above-described boiling liquor, and the use of any and all temperatures ranging from that indicated by an internal pressure in the boiler of 60 pounds to the square inch upwards, for the purposes above described, of reducing straw and other vegetable fibrous substances to a pulpy condition.

44,210.—Carpet-beater and Cleaner.—George P. Mitchell, Philadelphia, Pa.:

I claim, first, The rock-shafts, S S, with their whips, h, in combination with the endless ropes, e, the whole being arranged and operating substantially as set forth.

Second, The combination of the endless ropes, e, with the rock-shafts, V, and their whips.

Third, The cylindrical brushes, P P', in combination with the endless ropes, e.

Fourth, The combination substantially as described of the driving shaft, K, any convenient number of countershafts with their crank or crank wheels, and the upper and lower rock-shafts, S and V, with their whips, h.

44,211.—Sugar Mold Carriage.—Wm. Mitchell, New York City:

I claim a sugar mold carriage provided with a series of removable top plates having recesses and openings, either or both for the purpose of varying the capacity of the carriage to carry a greater or less number of molds, according to their size, as set forth.

I further claim the employment or use of two caster wheels, C C, at the front of the carriage, in connection with the bottom, A, corner pieces, G, and cross-pieces, b b, all arranged as shown to form a new and improved device, for the purpose specified.

[This invention relates to a new and improved carriage for conveying sugar molds to the drying rooms in sugar refineries. The object of the invention is to obtain a carriage for the purpose specified which will be capable of carrying all the different sized molds used in a refinery, and also capable of carrying a greater number of molds than any of the carriages hitherto constructed, and one which may be economically manufactured and drawn or manipulated with greater facility than usual.]

44,212.—Boot and Shoe Nails.—Bernard Morahan, Brooklyn, N. Y.:

I claim a nail, A, for boots and shoes with one or more spurs, a, and with a sharp edged head, b, as specified.

A nail provided with two or more spurs and having its head extended beyond one or both spurs, as shown in Fig. 10.

[This invention consists in a nail with a triangular or sharp-edged head and provided with one or more spurs or prints in such a manner that on driving the cams into the sole or heel of a boot or shoe, the head of the nail presses in flush with the leather and protects the same from wear, while at the same time the nail is prevented from being knocked out by coming in contact with a stone or sharp corner and the accumulation of dirt under its head is avoided.]

44,213.—Apparatus for Superheating Steam.—John E. Neill, Brooklyn, N. Y.:

I claim placing the superheating apparatus, substantially such as herein described, within the tube box or flue space of a steam boiler, substantially in the manner herein described and for the purpose specified.

I also claim dividing the superheating apparatus into two compartments, each consisting of a steam chamber and a series of circulating tubes, and the two connected by a steam chamber or passage, substantially as and for the purpose specified.

And I also claim the manner of forming the steam chambers and the nozzles connecting them with the pipes for supplying the saturated and conducting off the superheated steam, substantially as described and for the purpose specified.

I also claim controlling the action of the heat on the superheating surfaces by means of a damper or dampers, substantially as described, in combination with a flue space or spaces through which the products of combustion may escape, thereby affording the means of controlling the heat to be applied to the superheating surfaces without the necessity of damping the fire in the furnace.

44,214.—Mold for casting Ornamental Heads to Screws.—Wm. H. Nichols & Horatio H. Abbe, Chatham, Conn.:

We claim, first, The socket, B, and plates, E C D, in combination with the spring standard, A, for the purposes herein specified.

Second, Movable slot core pins, or slot cores, F D d d, in combination for forming screw slots, operating substantially as herein specified.

Third, The hinged upper plate, G, in combination with the movable slot cores, F D, arranged and operating as described.

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44,215.—Plow.—S. J. Olmsted, Binghamton, N. Y.:
I claim constructing plows with movable or adjustable mold board, moving up or down, substantially as herein set forth.

44,216.—Churn.—Jacob T. Palmer, Greencastle, Ind.:
I claim the perforated oscillating dasher, C, operated by the lever, E, in combination with the perforated abutment, D, arranged within the cream box, A, substantially as and for the purpose herein set forth.

[This invention consists in the employment or use of an oscillating dasher in connection with a central abutment placed within a cream box, whereby all the butter contained in the cream is produced expeditiously and with but a moderate expenditure of labor.]

44,217.—Sewing Machine.—Charles Parham, Philadelphia, Pa.:
I claim in combination with the shuttle carrier a needle guard, for forcing the needle back into its recess, should it from any cause be forced out therefrom, substantially as described and for the purpose set forth.
I also claim the movable needle-throat bridge, for covering the space between the feed-wheel and stationary needle throat piece, to prevent the cloth from getting jammed in said space, and to facilitate the moving and guiding of the cloth, substantially as described.
I also claim in combination with a laterally reciprocating feed-wheel, the laterally reciprocating plate on which the material rests, so that the cloth may be more readily moved and guided, substantially as described.
I also claim in combination with the laterally reciprocating bridge-piece and resting plate, the reciprocating gages for defining the distance of the sewing from the edge of the cloth, in making the whip or button-hole stitch, substantially as described.
I also claim the auxiliary alternating needle-thread take-up, which is used when the machine is converted from an ordinary stitch to a button-hole machine, for the purpose of taking up the additional thread drawn off from the spool by the operation of the looper, substantially as described.
I also claim the combination of the cam, stud, arm, and rock-shaft, for operating the auxiliary take-up and timing it so as to conform to the motions of the needle, shuttle and looper, substantially as represented.
I also claim in combination with the auxiliary alternating take-up, the spring check or clamp for checking the draw-off from the spool at every alternate stitch, substantially as and for the purpose described.

44,218.—Whip-holder.—Charles L. Pierce, Buffalo, N. Y.:
I claim a whip-holder having spring jaws, C, for the purpose and substantially as described.

44,219.—Churn.—H. Rice, Youngstown, Ohio:
I claim the special arrangement of the reciprocating hollow shafts, G and E, dashers, G′ F′, valve, h, and air-passage, g, in combination with the body, A, and connecting rods, b b and I, as and for the purpose set forth.

44,220.—Roofing Fabric.—Alfred Robinson, New York City:
I claim a roofing fabric made substantially as and for the purpose specified.

44,221.—Device for Stretching the Wires of Fences.—Wm. H. Robinson & Jacob Behel, Earlville, Ill.:
We claim the frame, a, spool, b, ratchet-wheel, d, and apertures, g and f, the whole constructed and arranged substantially in the manner and for the purpose specified.

44,222.—Parlor Stove.—James & Amos W. Sangster (assignor to Thomas J. Coury), Buffalo, N. Y.:
We claim, first, The central tube, F, passing through the stove, with a flange at its bottom as shown in Fig. 5, also the tube, J, which forms the center of the sieve and continues the tube, F, down through the bottom of the stove by connecting with it at the bottom as shown in Fig. 5, by means of the flange, S, also the funnel shape of the upper part of the tube, F, as shown at Z, also the tube, W W′, as shown and described.
Second, We claim the cover, A, standing upon legs as described and with the reflecting surface, P, also the cover, B, combined with the platform, D, and the tube, F.
Third, We claim the grate with the tube, F, passing through it, and the sieve, I, with the damper, X, in the center, and the tube, J, for the purposes set forth, also the damper, Y, at the bottom of the tube, W.
Fourth, We claim the oven, C, in combination with the tube, F, when constructed and operated as herein substantially set forth and described.

44,223.—Feathers for Beds.—George Schott, New York City:
I claim as a new article of manufacture for beds, mattresses, etc., feathers prepared in the manner set forth.

44,224.—Threshing Machine.—Gilbert L. Sheldon, New Marlboro' Mass.:
I claim, first, The introduction and use of the knives, r r r r, when constructed in the manner as and for the purposes described.
Second, I claim the combination in threshing machines of the dust box and flaps, C C, pipe, D, and knives, rr r r r, substantially in the manner and for the purposes described.

44,225.—Spirit Level.—H. S. Shepardson, Shelburne Falls, Mass.:
I claim constructing the frame of the instrument of metal, with a thin siding of wood to protect the interior arrangement from dust and injury.
[This invention consists in a novel manner of constructing the body or stock of the implement or device, whereby the same is prevented from warping or springing, and at the same time a light frame obtained. The invention also consists in a novel manner of arranging the adjustable spirit bulb whereby the same may be adjusted with the greatest facility and retained finely in the desired position. The invention further consists in an improved arrangement of a cross-wire sight, whereby the same may be readily adjusted higher or lower as occasion may require.]

44,226.—Truss.—Benjamin Sherwood, New York City:
I claim, first, The projecting fulcrum or teat, T, in combination with the plate, A, substantially in the manner and for the purposes described.
Second, The combination of the plate, A, having the projecting fulcrum as described, with the belt, B, or its equivalent, substantially as and for the purposes set forth.

44,227.—Water Wheel.—J. C. Simonds & Freeman Godfrey, Grand Rapids, Mich.:
We claim the circular recess, e, in the bottom of the hub, a, of the wheel forming the flange, f, to fit and work in the recess or rebate, g, in the block, h, in its arrangement with the scroll or spiral water passage, C, substantially as and for the purpose specified.

44,228.—Fire-place.—Hamilton E. Smith, Cincinnati, Ohio:
I claim the combination of the flexible screen or blower, A a, drum, B, pinion, F, worm, G, and crank, H, all arranged to operate as shown and described.

44,229.—Means of securing a Uniform Temperature in Packing and Preserving Houses, Hospitals, and other Buildings.—Daniel E. Somes, Washington, D. C.:
I claim, first, The slide, K, constructed and used in the manner and for the purpose set forth.
Second, The air-pipes, I I, extending into wells, trenches or any body or stream of water, with or without artificial refrigeration, substantially as described for the purpose of cooling any building or room.
Third, The air-pipes containing charcoal, for the purpose set forth.
Fourth, The air duct and air-pipes, when used in combination.
Fifth, A floor with openings, substantially as described and for the purpose specified.
Sixth, A floor with openings in combination with the air-pipes or air duct, or both.
Seventh, The use of water substantially as described, for the purpose of lowering the temperature of any building or room by means of evaporation.
Eighth, Constructing buildings for the purpose herein set forth with walls, floors and roof, so arranged as to maintain nearly a uniform temperature in combination the processes and apparatus for cooling, substantially as set forth.

44,230.—Water Wheel.—John Spaulding, Mount Holly, Vt.:
I claim the improved twisted plate auger moter or water-wheel, as made in manner and with diminishing channels, and to operate substantially as described.

44,231.—Machine for dressing Staves.—George Stevens (assignor to E. G. Weed), East Hardwick, Vt.:
I claim the reciprocating frame, E, provided with cutters, F F, in connection with the segmental or circular stave holding heads, H H, placed on a suitable shaft, G, and in such relation with the cutter bars, a a, of the frame, E, to operate in the manner substantially as and for the purpose set forth.

[This invention relates to a new and improved machine for dressing staves, that is to say, for cutting them in a proper curved form in their transverse section, so that their exterior surfaces will be convex and their inner surfaces correspondently concave, and the staves at the same time induced to an uniform thickness throughout their entire length.]

44,232.—Pumping Engine.—Wm. J. Stevens, New York City:
I claim the employment and arrangement of the secondary or assistant valve, N, the lever, W, the screw, Z, pin, Y, and valve rod, U, in combination with the small single acting cylinders, f f′, the cranks, h″ h‴, the pinion, h, and the main valve, b, for the purpose herein described.

44,233.—Stave-jointing Machine.—John S. Thompson, Glenn's Falls, N. Y.:
I claim, first, The reversable frame, D, placed within the carriage, C, in connection with the platform or frame, P, and cutter head or disk, N, when constructed and operating substantially as and for the purpose specified.
Second, The concave ways or guides, B B, in connection with the cutter head or disk, N, carriage, C, with reversable frame, D, and the platform or frame, P, all arranged to operate substantially as and for the purpose set forth.

[This invention relates to a new and improved machine for jointing staves, whereby the work may be done in a very expeditious and perfect manner and with very little labor on the part of the attendant.]

44,234.—Tanning Compound.—J. W. Taylor, North Collins, N. Y.:
I claim a tanning compound composed of the three ingredients prepared and mixed together, in about the proportions herein specified.

44,235.—Stove.—Jonn S. Tilton, Philadelphia, Pa.:
I claim the pipe, E, with the damper, d, or its equivalent, within the casing, B, of a stove communicating with the opening, c, substantially in the manner and for the purpose herein set forth.

44,236.—Seeding Machine.—G. A. Titus, Mantowville, Minn.:
I claim, first, The feed rollers, B, in combination with the triangular hopper, A, and openings, c, when constructed and operating as described.
Second, I claim the tubes, E, when constructed and operating as described.
Third, In combination with the tubes, E, I claim the pivoted furrow-openers, h, and spring, i.
Fourth, In combination with tube, E, I claim the adjustable covers, f, substantially as shown.
Fifth, I claim the concave scattering board, H, when constructed and operating as shown and described.

44,237.—Lady's Fan.—Joseph Todd and Isaac N. Todd, Madison, Wis.:
I claim, first, Constructing the leaves or blades of fans in the manner substantially as described, so as to receive photographic and other pictures.
Second, The combination of a photographic album with a fan, substantially as above described.

[This invention consists in providing a series of receptacles in the blades or leaves of folding fans for photographic and other pictures, so that they may be inserted and removed at pleasure.]

44,238.—Tree Protector.—William J. Towne, Newton, Mass.:
I claim the trough, B, in combination with the cover, D, attached to the rim of the inner edge of the trough, substantially in the manner and for the purpose set forth.

44,239.—Apple-corer and Quarterer.—James Seth Tripp, Danby, N. Y.:
I claim the combination of the inclined table, A, the cap, F, the pitman, C, and its spring, the horizontal handle and fruit presser, D, and pin, E, made and operating as described.

44,240.—Water Wheel.—John Tyler, West Lebanon, N. H.:
I claim having the lower rim, e, of the wheel provided with depressions, f, at the discharge sides of the buckets, a, for the purpose of admitting of the lateral or tangential discharge of the water from the wheel, so arranged that no portion of the buckets extend below said rim, substantially as described.

44,241.—Seeding Machine.—C. G. Vanstrum and P. G. Lindberg, Red Wing, Minn.:
We claim the adjustable hinged scattering board, E, in combination with the pendant levers, k, tappet, l, scalloped flange, n, stirrer, p, and adjustable seed slide, b, all constructed and operating in the manner and for the purpose herein shown and described.

[This invention relates to certain improvements in broadcast seeding machines which are so constructed that they can be used for different kinds of seed by a simple change in the distributing mechanism, or that the discharge of seed can be temporarily suspended while turning or driving from or to a field.]

44,242.—Utilization of Ratan Waste.—Cyrus Wakefield, South Reading, Mass.:
I claim, as a new manufacture, ropes, matting, baling cloth, and baskets, made in the manner substantially as described, from the waste products of the manufacture of chair-seating from ratan.

44,243.—Ruling Machine.—Chauncey Walton, Washington, D. C.:
I claim, first, The combination of two or more cloth cylinders with two or more sets of shifting adjustable beams and the main frame, to give the paper a longer or shorter traverse in the same frame and deliver it dry to the drop-box, substantially in the manner described.
Second, The combination of the heated roller frame with the main frame and the endless cloth, substantially in the manner described, for the purpose of using cloths of varying lengths in the same machine, under a uniform tension, and keeping the cloth dry under all hygrometric conditions of the atmosphere of the ruling room.
Third, The combination of fine wire, whether non-corrosive or otherwise, with the apron and with fine grooved rollers, substantially in the manner described, to secure a nearly uniform tension under all changes of moisture and temperature in the atmosphere of the ruling room.
Fourth, In so combining the carrying roller, H, with the carrying roller, J, and the carrying wires, that the same wires may be used to give a greater or less traverse of the paper through the machine, when arranged and operating substantially in the manner described.
Fifth, The combination of the drop-box, its hinged supports, and the sliding standards, for the purpose of changing its position in the frame to any length of traverse of the paper, and to receive the same at any angle of delivery desired, when arranged substantially as described.
Sixth, The combination of the longitudinally movable disks, with the screw roller and the carrying roller, J, substantially in the manner described, to press the paper into the box without blotting and while the ruled lines are yet moist.
Seventh, The combination of one or more auxiliary extension pen clamps with the pen beam, substantially in the manner described, for the purpose of automatically ruling lines of varying lengths at the same time and upon the same sheet or sheets of paper.
Eighth, The combination of a pen carrying a spring at each end with pens of different lengths or with pens placed at different angles to the paper, substantially in the manner described and for the purpose set forth,
Ninth, The combination of a pen beam, with a fountain and with the mechanism for balancing the beam, when arranged and operating, substantially as and for the purpose described.
Tenth, The combination of the front carrying cloth roller, with the roller, B, and with the cloth, when so arranged and operating that the cloth and roller, B, shall each contribute to drive the front roller and render its tension uniform at whatever position it may be in its bearings.
Eleventh, The combination of the curved slotted bearings, O, with the pen beam, substantially in the manner described, so that the position of the beam shall be adaptable to any length of traverse, through the machine and at the same time permit in all positions a longitudinal vibration of the beam at the will of the operator.
Twelfth, The combination of the driving gear, the box, for the same and a self-acting pawl, arranged and operating substantially in the manner and for the purpose described.

44,244.—Inhaling Apparatus.—Charles Warren, Milford, Mass.:
I claim the combination and arrangement of the two nostril pipes, C D, with the vessel, A, its cap, B, and an air induction pipe, E, the same being substantially as described.
And I also claim the combination and arrangement of the air-tight flexible valve, F, with the two nostril pipes, C D, and the vessel, A, provided with a cap, B, or its equivalent, and an air induction pipe, E, the whole being substantially as explained.

44,245.—Door and Window Fastener.—Henry Wilkinson, Newburgh, N. Y.:
I claim the combination of the two double-headed armed liver bits, d d′, the revolving barrel, c, and the sliding plates, e e′, with the bolts, g g′, and the latch, D, whereby a door can be secured at top and bottom, and the bolts be withdrawn by a single turn of the knob either right or left, substantially in the manner described and represented.

44,246.—Furnace Heater.—George W. Wilson, Chelsea, Mass.:
I claim the combination of the flue chamber, H (having flues, i k l, as described), and the three pipes, I K L (connected and provided with a damper as explained), with the fire-chamber, A.
I also claim the combination and arrangement of the flue-chamber, H, and the pipes, I K L, the air duct, F, the base chamber, D, the air chamber, C, and the fire-place or chamber, A, the whole being constructed and applied and so as to operate together, substantially as specified.
I also claim the combination and arrangement of the fire-place, A, the air chamber, C, the vessel, M, and the distributing drum, O.
I also claim the combination and arrangement of the fire-place, A, the vessel, M, the drum, O, the air-chamber, C, the base chamber, D, the air duct, F, the smoke-chamber, H, and the smoke pipes, I K L, the whole being applied and connected together, substantially as described.
And in combination with the air duct, F, of the air heating furnace, I claim the vibrating valve, G, flanges, d e, and openings, c f, the whole being to operate in manner and for the purpose substantially as specified.

44,247.—Rotary Engine.—Sylvester A. Wood and August F. Dunke, Manitowoc, Wis.:
We claim, first, The use of the sliding piston in the revolving cylinder, B, in combination with the steam chambers in the stationary cylinder, C, and the ports for the introduction of steam at the different points, communicating with all the steam chambers, by the arrangement and combination of which the full surfaces of two pistons are constantly exposed to the pressure of the active steam, thereby securing (at a given pressure of steam) a uniform power and velocity to the revolving cylinder throughout its entire revolution, substantially as herein represented and described.
Second, We claim the self-expanding lap-jointed metallic rings, 8 8 8 8, in combination with the rabbets and grooves in the revolving cylinders, and the rabbets in the stationary cylinders for packing the joints between the revolving and stationary cylinders, substantially in the manner and for the purpose herein shown and set forth.
Third, We claim the sliding plates, 4 4 4, in combination with the springs, 5 5 5, attached in the cam groove plates, substantially as and for the purpose herein shown and described.
Fourth, We claim the whole arrangement for reversing the engine by combination of the circular rim, K, the valves, c c c, the lever, L, and the steam pipes, e e e, substantially in the manner and for the purpose herein represented and described.
Fifth, We claim the revolving cut-off valves, m, with the set screws, 3, at the ends of the valve shafts, d d d, substantially in the manner and for the purpose herein shown and described.

44,248.—Evaporator for Saccharine Juices.—S. F. Woodworth, Iowa Falls, Iowa:
I claim, first, The application of revolving pans, F G, to the return flue, B, in combination with the damper, E, constructed and operating in the manner and for the purpose substantially as herein shown and described.
Second, The combination of the secondary flue, C, and pan, I, with the return flue, B, and revolving pans, F F, substantially as and for the purpose set forth.

44,249.—Machine for cutting Paper for Paper Twiue, etc.—J. B. Wortendyke, Goodwinsville, N. J.:
I claim, first, The two rollers, C C, in combination with the cylinders, B D, arranged relatively with each other, to operate in the manner substantially as and for the purpose herein set forth.
Second, The employment or use of two or more shafts, F F, to receive the blocks, G, on which the cut paper strips are wound, substantially as and for the purpose specified.
Third, In combination with the cutting devices as stated I claim the securing of the blocks, G, on the shafts, F, by means of a friction device for the purpose of allowing each block to have a separate or independent movement, substantially as set forth.

44,250.—Process of Bleaching.—Alexander Robertson Arrott, Saint Helen's, England, assignor to John B. Meldrum, New York City:
I claim the employment or use for the purpose of bleaching vegetable fibers used for textile fabrics or other purposes of a solution containing a bleaching chloride and an alkali mixed together, substantially as herein described, whereby the bleaching process is completed, and boiling and scouring may be dispensed with.

[This invention consists in the employment or use for the purpose of bleaching vegetable fibers used for textile and other purpose, of a solution containing a bleaching chloride and an alkali, the bleaching being completed in this liquid and the use of free chlorine altogether avoided.]

44,251.—Machine for making Bungs.—John Batchelder, Canaan, N. H., assignor to Abraham Batchelder, Lowell, Mass.:
I claim, first, The spindle, L, in combination with the hollow pulley shaft, e, spring, d, arm, a, sliding shaft, b, and cam, D, or their equivalents, substantially as described and for the purposes set forth.
Second, The inclined plane or groove, u, in combination with the cam, H, the cutter, s, cutter shaft, s, and the devices for operating the same, or their equivalents, substantially as described for the purposes set forth.
Third, The feed-box, S, in combination with the spring, p, lever, o, and cam, G, or their equivalents, for centering the blocks automatically, substantially as described for the purposes set forth.

44,252.—Lamp Heating and Shaving Apparatus.—Chas. S. Bourne (assignor to himself and Wm. E. Udell), Springfield, Mass.:
I claim a shaving and heating apparatus, made substantially as herein shown and described.

[This apparatus contains a lamp, soap-dish, and water vessel, so combined as to form an improved article of manufacture, portable, ornamental in appearance, and designed for use upon the dressing-table, in the sick room, or wherever it can be conveniently employed.]

44,253.—Filter.—Wm. T. Class, Cumminsville, Ohio assignor to E. Rubenow and Charles Joseph, Cincinnati, Ohio:
I claim the single case, A, with an inlet and exit pipe and manhole, and a perforated diaphragm dividing the interior of the case into two apartments, one of which shall contain paper pulp or macerated paper as a filtering medium, all as herein described and represente

44,254.—Machine for making India-rubber Hose, Belting, etc.—James Bennett Forsyth (assignor to himself and Charles McBurney), Roxbury, Mass.:
I claim a machine for making hose, round packing, cord, wringer-

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rolls, tubing, and similar articles of rubber or rubber and cloth, consisting essentially of the parallel rolls, D E and M, operating substantially as described.

44,255.—Cooking Stove.—Horace J. Firzelee, Syracuse, N. Y.:

I claim, first, The arrangement of the air passages in their relation to the fire-box and the other parts of the stove, by which the air for combustion may be taken from the front or back part of the stove, or from both ends of the stove, as described.

Second, I claim the ash-pin and gridiron or boiler as combined, and as arranged to be used either in or out of the ash-pit, as herein recited.

Third, I claim suspending or sustaining the grate on wheels, substantially as set forth.

44,256.—Velocipedes.—Joseph Goodman, Blackfriar's Road, England, assignor to Charles P. Button, New York City:

I claim the combination of the steering devices consisting of handle, D, operating through cords, E E, with the tiller, b, which by rotation of the arbor, c. turns the arms, d, and causes the guide wheel to swerve to the right or left as may be desired by the motion of the axle in the slotted bearings of the fore carriage, the whole of the devices mentioned being combined in the manner and used for the purpose described.

[This invention consists in connecting treadles and hand levers to the cranked axle, to which the main wheels of the carriage are fixed, in such a manner that the velocipedes can be propelled either by hand or by the feet, or by the combined action of both hands and feet.]

44,257.—Quartz Crusher.—A. W. Hall (assignor to himself, Samuel Jandon, and R. H. Belden), New York City:

I claim, first, The wheels, F F, in combination with the crushers, E E, one or more, placed on the radius arms, D D, the pressure frame, G, and the annular trough, B, substantially as and for the purpose set forth.

Second, The screw rods, J, nuts, K, and cams, e, all arranged with the frame, C, for applying the pressure to the crushers, E, substantially as set forth.

Third, I claim the peculiar construction of the scraper, O, with its adjustable spring staff or handle, made of a bow shape, pivoted to a stud on the main rotating shaft, and provided with a screw, P, for the purpose of graduating the pressure of the scraper, substantially as and for the purpose described.

44,258.—Process for deodorizing Petroleum, Naptha, etc.—Sylvester Lewis, Rochester, N. Y., assignor to Union Oil Company:

I claim the deodorizing of petroleum and kerosene oils, naptha, benzone, and benzine, by the use of ashes and charcoal, substantially as set forth.

44,259.—Harvester.—D. B. Luckey, Bloomingburgh, N. Y., assignor to himself and S. S. Boardman, Rochester, N. Y.:

I claim, first, The rod, H, attached at its front end to the rear of the shoe, I, by a joint, f, and connected at its back end by a universal joint, e, to a shaft, G, fitted loosely in a tube or bearing, d, at the lower end of a pendant, F, at the rear of the frame, A, substantially as and for the purpose set forth

Second, The connecting of the shoe, I, to the frame by means of two or more rods, K K', one or more of which is allowed a vertical play at its outer end by having its pin, j', fitted in an oblong slot, k, in the pendant in which it is secured to admit of the rising and falling of the front part of the cutter and shoe bar, as herein described.

Third, The connecting of the pin or pins, j, which are allowed the rising and falling movement to the frame, A, by means of a rod or rods, L, to prevent friction which would otherwise attend the working of the pin or pins, j, in their slots.

[This invention relates to a new and improved grain and grass harvesting machine, of that class in which the cutter bar is connected to the machine by a joint, to admit of the cutter bar rising and falling freely, to conform to the inequalities of surface over which it may pass, and also to admit of it being turned up out of the way when the machine is not in use, or when it is being drawn from place to place.]

44,260.—Fruit and Vegetable Dessicating Apparatus.—J. A. Miller, New York City, assignor to Charles Alden, Newburgh, N. Y.:

I claim, first, The horizontal air-flue, E, vertical pipes, c', and furnace, D, in combination with the tower, A, containing a series of movable aprons or shelves, the whole being constructed and operating in the manner and for the purpose substantially as herein specified.

Second, The adjustable shelves, G, and zig-zag tubes, H, arranged in combination with the hot-air furnace, D, shelves, C, and aprons, B, substantially as and for the purpose herein shown and described.

44,261.—Pen and Pencil Holder.—Richard Ryne (assignor to Wm. S. Hicks), New York City:

I claim the combination of the hollow handle, a, constructed as described with the sliding pen and screw pencil, when the parts are united by means of the short tube, h, or its equivalent, substantially as herein set forth.

44,262.—Means of utilizing Fine Fuel.—Eli Thayer Worcester, Mass., assignor to Nathaniel T. Spear New York City, and S. P. Pond, Brooklyn, N. Y.:

I claim the within described method of utilization of fine fuel, the same consisting in introducing it in a plastic condition into the stove and providing a hole or passage, E, extending from the top to the bottom thereof, for the purpose of kindling and of draught, substantially as set forth.

44,263.—Apparatus for Burning Fine Coal, etc.—Eli Thayer, of Worcester, Mass., assignor to Nathl. T. Spear, New York city and S. P. Pond, Brooklyn, N. Y.:

I claim as a new article of manufacture the hollow former, E, provided with means for readily withdrawing it and adapted to be used in the interior of a mass of plastic fuel, G, substantially in the manner and for the purpose herein set forth.

44,264.—Oil-Well Pumps.—Joshua Thomas Jr., (assignor to himself and B. Barker), Cleveland, Ohio:

First, I claim the valve plungers, R S T, valves L M N, and sectional jointed pump rod, B, when arranged so as to operate in combination with two or more coupled chawbers, G H I, conjointly, as and for the purpose described.

Second, In combination therewith I claim the auxiliary side pipe, D, substantially as and for the purpose set forth.

44,266.—Steps for the Spindles of Spinning Frames.—Benj. G. Watson and A. W. Thurber, (assignor to Benj. G. Watson and Ira G. Briggs), Jewett city Conn.:

I claim the combination with the step, A, and spindle, B, of the cup C (fitting at top the main position b of the spindle), the concave shoulder, c, small cylindrical journal, a, and chamber, g, when all the said parts are constructed, arranged and employed in the manner and for the purpose herein specified.

44,266.—Last.—Henry M. Whitmarsh (assignor to himself and Meritt Nash, Abington, Mass.:

I claim a toe piece made separate from the body of the last, so that it may be removed, and another of different form substituted, substantially as prescribed for the purpose set forth.

[This invention has for its object two essential results—first, to protect the lower end of the spindle and interior of the step from dust, and portions of cotton, the former of which soon cuts and wears the spindle so as to render it useless, and the latter, by its absorbant quality, depriving the step of oil, so as to cause the spindles to wear from being imperfectly lubricated. Second, to prevent the oil being thrown from the step by the rapid revolution of the spindle—a contingency which invariably occurs when the spindle is first started.]

44,267.—Machine for Cutting Bungs.—Ferdinand Zunkeler (assignor to himself and Frederick Schultze), Cincinnati, Ohio:

I claim, first, The arrangement of guide channel, B, intermittent feed rollers, C C', rotating and sliding cutter H, and intermittent clamps, J J', with their described or equivalent accessories; the whole being combined and operating substantially as set forth.

Second, I claim the construction of the conical cutter, I I', with one or more slits or cutting edges by which it is adapted to shave or "slick" the periphery of the bung in the act of cutting.

44,268.—Portable Capstan.—Edward G. Ament, Oswego, Ill.:

I claim, first, Attaching the body of the capstan to the axle-tree in the manner, and adapting it to move in a vertical plane, radically to the longitudinal center of the rear axle, substantially as and for the purpose herein set forth.

Second, I claim the combination of the guide and pulley, k k, with the tongue K, and chain, O, or its equivalent and the top tongue, M, substantially as and for the purpose herein set forth.

Third, I claim the combination of the swivel-bearing S, e, with the posts, P P, employed substantially as and for the purpose herein set forth.

Fourth, I claim the employment of the second tongue, L, an otherwise rigid bearer, in combination with the forward part of the frame, A, substantially as and for the purpose herein set forth.

Fifth, I claim the combination of the tongue K, chain O, or its equivalent and guide and pulley, k, k', with the swivel bearing, S, l, and posts P P, and with the second tongue L, substantially as and for the purpose herein set forth.

Sixth—I claim pivoting the adjustable anchors, H H, and stirrups h, to the sills of the frame, A, in connection with the slot, J, or its equivalent, substantially as and for the purpose herein set forth.

Seventh, I claim the lever-standard, F, in combination with the lever, E, catches d, d', pin and gudgeon connection e, and spool spire, B''', as and for the purpose herein set forth.

Eighth, I claim in combination with the operative parts of a portable capstan, the rope turner T, formed substantially as described and adapted to receive and carry outward the rope, and to lay it over upon the next preceding layer of coils, substantially in the manner and for the purpose herein set forth.

Ninth, I claim a self-operating mechanism composed of a rope turner T, and catch T', adapted to move longitudinally upon the spool B, and to be automatically put in operation at the proper time, substantially as and for the purpose herein set forth.

44,269.—Manufacture of Gun Powder.—Henry Edwin Drayson, Edgeworth Lodge, England:

I claim, first, The process of making gun powder so far as the same is developed in the first degree thereof, substantially as herein described.

Second, The Process of making Gun Powder so far as the same is developed in the second degree thereof, substantially as herein set forth.

44,270.—Mode of Molding and Finishing Pottery Wares.—Francis Durand, Paris, France. Patented in France, April 15, 1863:

I claim, first, By making use of thin sheets of india rubber or other suitable elastic material, fixed or not on the mould or lower die, or on the upper or counter die or stamping-tool, in the manner as above described, with an intermediate tissue interposed or not as required, for the purpose of allowing the free escape of the air contained between the upper and lower dies, so as to allow an automatical moulding and unmoulding of any article of ceramic or other suitable plastic material.

Second, The improvement in the potter's lathe, represented in fig. 4, in which lathe an india rubber or other suitable impermeable elastic pouch or inverted bell-shaped bag serves for steadying or fixing in position the article to be finished by the effect of a partial vacuum or secretion underneath the same in the said pouch.

44,271.—Loom.—Frederick Maurice Wolf (assignor to F. E. Obermuller), Glanchan, Saxony:

I claim, first, The movable blocks, c,* applied in combination with the large cylinder, O, substantially in the manner and for the purpose herein shown and described.

Second, The arrangement of the lever, E, working beam, J, hinged harness board, H, elbow levers, M, and arms a, in combination with each other and with the cylinders, O b, and griff frame, F, substantially as herein specified, so that simultaneously with the rising of the griff frame and depressing of the harness board the cylinders, O and b, are moved and turned.

Third, The slotted needle plate, d,* and palisades, c, in combination with the needles f, and skewers, G, arranged and operating in the manner and for the purpose substantially as herein set forth.

Fourth, the endless chain, c', composed of a series of plates each capable of receiving and holding a quantity of adjustable blocks c,* constructed and operating substantially as herein specified, so that by a simple change in the blocks the pattern or design can be changed at pleasure.

44,272.—Pump.—William S. Kelly, Schenectady N. Y.:

First, I claim casting or otherwise applying a receiving vessel, G, directly to the body of the pump, in such manner that the water shall be forced through the piston rod into this vessel before entering the discharge pipe, substantially as described.

Second, Passing the piston rod up through the receiving vessel, G, when the latter is secured to the body of the pump, substantially as described.

Third, In a pump having a receiving vessel, G, applied directly to it, I claim connecting the pump rod to the hollow piston rod at a point directly above said vessel, substantially as described.

Fourth, Conducting the water from a receiving vessel, G, having a piston rod passing through it, and otherwise operating substantially as described.

Fifth, Introducing a water-tight packing, for the piston rod, between the chamber of vessels, G, and the pump cylinder, i i, substantially as described.

Sixth, Constructing the receiving vessel, G, and the cylinder of the pump, with an annular recess within the neck of the former, adapted for receiving any suitable material for packing the piston rod, substantially as described.

Seventh, Providing for renewing the packing to the annular recess, h, when the vessel, G, and pump cylinder are cast in one piece by means of openings, i i, substantially as described.

Eighth, Closing the piston C', above the openings, g g, substantially as and for the purposes described.

Ninth, Applying the receiving vessel, G, either by casting or otherwise, directly to the body of a pump having a hollow piston rod, substantially as described.

RE-ISSUE.

1,760.—Sewing-machine Guide.—Daniel Barnum, New York City. Patented Feb. 12, 1861.:

I claim, first, The use of thin sheet or light elastic spring metal, for making automatic clamping furnaces, extending out from the gaging line of a sewing-machine gage, and in combination therewith, beyond the line of seam to be sewed by a needle, and of thus producing a gentle automatic spring pressure upon the upper surface of flexible material, while the same is approaching the needle, and thereby automatically smoothing and holding the said material preparatory to its being sewed, outside of the line of the seam, as well as between it and the line of the gage, substantially as and for the purposes specified.

Second, I claim, also, The use of thin sheet or light elastic spring metal for making automatic clamping spring surfaces, as specified, in combination with diagonal corrugations, stuck up thereon outside of the line of the seam, to be sewed by a sewing-machine, substantially as and for the purposes specified.

Third, I claim also the use of thin sheet or light elastic spring metal, for making automatic clamping surfaces, as specified, in combination with the incline plane or leveled edges which are turned or struck up, as described, to facilitate an easy entrance, of varying thicknesses, and uneven surfaces of material, under the upper clamping surface, substantially as and for the purposes specified.

1,761.—Cleaning and Separating the Fibers of Flax, Hemp, etc.—George W. Billings, New York. N. Y.—Patented March 8, 1864. Antedated Feb. 21, 1864:

I claim, first, The process herein specified, of subjecting vegetable fibers to a retting or fermenting operation after the stalk or other woody portions, have been removed, or partially removed, for the purposes, and substantially as specified.

Second, I claim the process of washing the vegetable fiber in alternate directions for its cleansing, while contained in a closed vessel, for the purpose and in the mode substantially as specified.

1,762.—Harvesters.—Rufus Dutton, Brooklyn, N. Y.—Patented March 19. 1861:

I claim constructing the casing of the secondary gearing, substantially as described, so that such casing shall not only receive and protect such gear from grass, dirt, &c., but shall also form or furnish the bearings of the counter shaft of such gear, substantially as and for the purposes set forth.

Also, The conical skeleton track-clearer, formed of spiral rods or wires, when connected at their outer ends by weighted clamps, substantially as described.

1,763.—Harvesters.—Rufus Dutton, Brooklyn, N. Y. Patented March 19, 1861:

I claim raising the outer end of the finger-box of harvesters, having a flexible finger bar, by means of a lever supported on the same joints with the finger-bar, or on the shoe or heel of such bar at or near such joints, and turning freely toward the finger-bar, but rigid with it when turned in an opposite direction, by causing such lever, when the heel of the finger-bar is raised, to be brought in contact with the pole or the frame of the machine, or a projection therefrom, so as to press or force down such lever, and thereby raise the water out of the finger-bar, substantially as set forth.

I claim a guard-finger, made in a single piece, covering the sickle bar, and having openings in the bottom thereof for the escape of rass and other substances entering with the sickle, when said guard-finger is provided with a bearing surface, as i, connecting the upper and lower portions of said guard-finger and resting against the edge of the finger-bar, and is braced and sustained against lateral strain, as herein set forth

1,764.—Machine for Oiling Wool.—George Harwood and George H. Quincy, Boston, Mass., assignees of Wm. Clissold, Dubridge Works, Stroud, Eng. Patented Feb. 24, 1862:

We claim, first, The oiling of wool by means of a pressure-roller, supplied with oil or oleaginous mixture, in the manner, substantially as set forth.

Second, A machine or apparatus for oiling wool, consisting of the following elements combined: 1st. One or more reservoirs for containing the oil or oleaginous mixture; 2d. A dipper or dippers and a brush or brushes, the former to convey and the latter to receive the determinate and requisite quantity of oil or oleaginous mixture; 3d. A distributor or distributors, receiving oil or oleaginous mixture from the brush or brushes, and transferring it to the wool, substantially as set forth.

Third, The combination, with an oil reservoir and intermediate dipper and brush, or other equivalent device for conveying oil in requisite quantities to the distributor, of a pressure roller, arranged immediately in front of the feed-rollers, above the feed apron of a carding or other wool-preparing machinery, substantially as set forth.

Fourth, In a wool-oiling apparatus, in which the wool is oiled by imprinting the oil as described, we claim, in combination with a pressure-roller, or the equivalent thereof, a brush or brushes, charged with oil, by means of one or more dipping plates, substantially as set forth.

Fifth, The combination with one or more oil reservoirs and traveling brush or brushes of a plate or plates for changing the said brush or brushes with the requisite amount of oil, and when arranged for action so as to properly agitate the oil or oleaginous mixture, substantially as set forth.

Sixth, In combination with a distributing pressure-roller we claim a brush, traveling diagonally over the said roller; that is to say, at an angle with the axis of, but in a plane tangent to the roller, substantially as and for the purposes set forth.

1,765.—Machine for Boring Metal.—John Meyer, Brooklyn, N. Y. Patented June 16, 1863:

I claim, first, The swivel arm or disk, D, in combination with the driving shaft, A, constructed and operating substantially as and for the purpose set forth.

Second, The swivel arm, h, in combination with a suitable driving shaft, and with the bore-spindle, constructed and operating substantially as and for the purpose specified.

1,766.—Oar.—W. H. McMillan, New York City. Patented April 19, 1864:

I claim an oar, made in separate pieces, of any suitable material or materials, and connected together, substantially as herein described.

1767.—Leather-splitting Machine.—A. H. Van Gieson and Ebenezer A. Smith (assignor by mesne assignments of A. H. Van Gieson), Newark, N. J. Patented July 8, 1862:

I claim, first, The combination of the bed 1, fingers 22, and roller 5, or equivalent device for spreading and holding the leather, the knife 7, or its equivalent for splitting the leather, and the drawing rollers 9 & 10, or equivalent device for drawing the leather through the machine: these three parts or elements, to wit: the spreading and holding device, the knife, and the drawing devider, being so combined as to accomplish the result stated—that is to say, to draw and hold the leather to the knife by its own tension instead of by pressure, not confining myself to the particular form or construction of the various parts so long as these three essential elements are combined substantially as and to the effect above set forth.

Second, I also claim the combination of the gauge 6, with the spreading and holding device, above defined substantially as and to the effect above stated.

Third, I also claim the combination of the corrugated bed 1, the weighted fingers 2, and the roller 5, substantially as and for the purpose set forth.

1768.—Carriage Wheel.—Harmon G. Weibling, Denver City, Colorado. Patented January 20, 1863:

I claim the application of friction rollers particularly imbedded in a groove in the under side of the axle or spindle upon which the wheel is placed, substantially as and for the purposes above described.

I also claim as my invention the application of the friction rollers, E E E, imbedded partially in the surface of the shoulder H, and the nut M, as and for the purpose above described.

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Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, Sept. 7, 1864, to Wednesday, Sept. 14, 1864:—M. W., of N. Y.; J. F., of N. Y.; A. W. H., of N. Y.; W. C., of N. Y.; E. R., of Mich.; G. & C., of Conn.; J. A. McG., of Ind.; W. P P., of Pa.; J. R. C., of Pa.; W. H. W., of N. Y.; P. J. G., of N. Y.; E. H. C., of Mich.; J. C. J., of Mass.; P. W. P., of England; A. W. H., of N. Y.; H. R., of Austria; W. B., of N. Y.; B. S., of N. Y.; J. P. W., of N. Y.; D. J. T., of N. Y.; J. & N., of N. H.; H. B. S., of Wis.; E. C., of Mass.; C. H. R., of Maine; S. H. M., of Ill.; J. K. K., of N. H.; T. H. W., of Pa.; G. E. H., of Maine; N. D. H., of Conn.; S. R., of Ark.

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PROPOSALS FOR HARNESS IRONS.

ORDNANCE OFFICE, WAR DEPARTMENT,
Washington, Sept 1, 1864.

Proposals will be received by this Department until Saturday, the 17th day of September, at 4 o'clock P. M., for the delivery at the Springfield Armory, Mass., Watervliet, Frankfort, or New York Arsenals, of 6,000 single sets of Wrought Iron Work, for United States Artillery Harness.

The Harness Irons are to be packed in well made boxes, containing twelve single sets each, being an assortment for four wheel and eight lead horses; and each twelve sets, so packed, will consist of the following pieces:—

3 pairs long Hames, complete.
3 pairs short Hames, complete.
6 pairs medium Hames, complete.
48 Trace Clips, with 144 rivets.
4 Double Loops or Eyes.
12 Saddle Loops (bent for cantle).
24 Trace Eyes.
24 long Chains, with toggles.
4 Breast Hooks.
2 Leg Guards, with ten rivets.
6 Saddle Loops, straight, for riding-saddle pommels.

These Harness Irons are to conform strictly in pattern and weight to the model sets to be seen at this office and at the Springfield Armory; are to be smoothly finished; are to fill the standard gages, and each piece is to be made of the size and kind of iron prescribed in the official bill of iron, copies of which can be obtained at this office, at the New York Agency, and at the Springfield Armory.

All the Irons are to be well japanned—the japan to be of the best quality, and well baked on. They are to be subject to inspection at the factory where made, before and after japanning.

The Hames are to be marked with the maker's name, the size, and the letters U.S.A. The latter letters one-fourth of an inch high.

All the pieces are to be put up in proper bundles, properly labelled, and each box is to be carefully packed, as prescribed by the Inspector. The packing-box to be paid for at the Inspector's valuation.

Deliveries are to be made at the rate of not less than sixty sets per day, commencing on the 1st day of October, 1864, next.

Failure to deliver at the specified time will subject the contractor to a forfeiture of the number he may fail to deliver at that time.

No bids will be considered except from parties actually engaged in the manufacture of this or similar kinds of iron work, and who can bring ample evidence that they have in their own shops all the machinery and appliances for turning out the full amount of work specified per day.

GUARANTY.

The bidder will be required to accompany his proposition with a guaranty, signed by two responsible persons, that, in case his bid be accepted, he will at once execute the contract for the same, with good and sufficient sureties, in a sum equal to the amount of the contract, to deliver the articles proposed, in conformity with the terms of this advertisement; and in case the said bidder should fail to enter into the contract, they to make good the difference between the offer of said bidder and the next responsible bidder, or the person to whom the contract may be awarded

The responsibility of the guarantors must be shown by the official certificate of the Clerk of the nearest District Court, or of the United States District Attorney.

Bonds in a sum equal to the amount of the contract, signed by the contractor and both of his guarantors, will be required of the successful bidder or bidders upon signing the contract.

FORM OF GUARANTY.

We, the undersigned, residents of ———, in the county of ———, and State of ———, hereby jointly and severally covenant with the United States, and guarantee, in case the foregoing bid of ——— be accepted, that he or they will at once execute the contract for the same, with good and sufficient sureties, in a sum equal to the amount of the contract, to furnish the articles proposed in conformity with the terms of this advertisement, dated Sept. 1, 1864, under which the bid was made; and, in case the said ——— shall fail to enter into a contract, as aforesaid, we guarantee to make good the difference between the offer of the said ——— and the next lowest responsible bidder, or the person to whom the contract may be awarded.

Witness: { Given under our hands and seals this —— day of ——, 186—.

[Seal.]
[Seal.]

To this guaranty must be appended the official certificate above mentioned.

Forms of bid can be obtained at any of the above named arsenals. Proposals not made out on this form will not be received.

Bids will be received for the entire number or any part thereof; and bidders will state the arsenal at which they can deliver, and the number of sets at each, if for more than one.

The Department reserves the right to reject any or all bids if not deemed satisfactory.

Proposals will be addressed to "Brigadier General George D. Ramsay, Chief of Ordnance, Washington, D. C.," and will be endorsed "Proposals for Harness Irons."

GEO. D. RAMSAY, Brigadier General,
12 2 Chief of Ordnance.

QUARTERMASTER'S OFFICE, Philadelphia, Sept. 6, 1864.

SEALED PROPOSALS WILL BE RECEIVED AT this office until 12 M., on Monday, the 26th instant, for furnishing Anthracite Steamer Coal for the War Department, for a period of six months, commencing Oct. 1st, 1864, and ending March 31st, 1865. Coal to be of the best quality Anthracite for the use of steamers, to weigh 2,240 lbs. to the tun, and to be subject to inspection.

The coal is to be delivered on board vessels in the ports of Philadelphia or New York, in such quantities, and at such times as may be required, furnishing, if demanded, seven thousand tuns per week.

In case of failure to deliver the coal in proper quantity, and at the proper time and place, the Government reserves the right to make good any deficiency by purchase at the contractor's risk and expense. The price must be given separately for the coal delivered on board of vessels at this port and New York, on the terms and conditions above stated. Twenty per cent will be withheld from the amount of all payments made, which reservation is not to be paid until the contract shall have been fully completed. Payments of the remaining eighty per cent, or balance due, will be made monthly, when the Department is in funds for that purpose.

Each offer must be accompanied by a written guarantee, signed by two or more responsible parties (their responsibility to be certified by a United States District Judge, Attorney, or Collector), that the bidder or bidders will, if his or their bid be accepted, enter into written obligation, with good and sufficient sureties, in the sum of one hundred thousand dollars, to furnish the proposed supplies. No proposition will be considered unless the terms of this advertisement are complied with.

The right is reserved to reject all the bids if considered to be to the interest of the service to do so, and no bid from a defaulting contractor will be received.

Proposals to be endorsed "Proposals for Coal for the War Department," and addressed to the undersigned.

By order Col. A. J. PERRY, Q. M. Dept. U.S.A.
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PARTICULARLY DESIGNED FOR
RAILROAD AND CAR SHOPS.
ALSO, FOR
PLANING MILLS,
Hub and Blind, Cabinet, Box Wheel, Felloe and Spoke, Stave and Barrel Manufactories, Agricultural Implement Makers, &c.

Warranted superior to any in use. Illustrated Catalogues furnished on application. 8 12*

PORTABLE STEAM ENGINES—COMBINING THE maximum of efficiency, durability, and economy with the minimum of weight and price. They are widely and favorably known, more than 300 being in use. All warranted satisfactory or no sale. Descriptive circulars sent on application. Address J. C. HOADLEY & CO Lawrence, Mass. 9 tf

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WHAT THE COUNTRY WANTS, AND HOW TO make Money.—To you that know of the fortunes made by manufacturers of some of the recent inventions—the Sewing Machine, or the Reaper and Mower, for instance—and would like to emulate them, we offer to sell (subject to a moderate license fee) the exclusive right to manufacture and sell in the Northern States, Comstock's Rotary Spader, a substitute for the Plow, on terms that with capital and enterprise will insure a success heretofore unknown in the history of inventions.

Its practical value has been fully proven by sale and successful use in the field the past two seasons, creating a demand we are unprepared to supply. Its utility is greater, and the field open to its use is larger, than that of the Reaper and Mower, the manufacture of which for the harvest of 1860, is estimated by the Commissioner of Patents to number ninety thousand machines.

We will sell as above proposed, or sell less territory—not less than a State. Will go into a firm or joint stock company, at a suitable point, or consider propositions of any nature looking to a speedy establishment of the manufacture on a suitable scale. Address COMSTOCK & GLIDDEN, Milwaukee, Wis. 11 4*

FOR SALE.—THREE MILLING MACHINES, OF the best style, and but little used. Also a complete set of tools, gages, &c., for making bands for the Springfield musket. S. STOW, Manufacturing Company, Plantsville, Conn. 11 4*

TO INVENTORS AND MAKERS OF KNITTING Machines.—Wanted, the best machine for knitting stockings, that will finish its work—plain or ribbed—from top to end of toe, widening or narrowing, as may be required, by pattern or otherwise, by its own mechanism. Address, giving illustrated description and price, Post-office Box 294, New Bedford, Mass. 11 3*

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N. B.—Send Postage stamp for Descriptive Circular of the Diamond Dresser. 11 10*

ALCOTT'S CONCENTRIC LATHES.—FOR BROOM, Hoe, and Rake Handles, Chair Rounds, &c.—Price $25; and all other kinds of Wood-working Machinery, for sale by S. C. HILLS, No. 12 Platt street, New York. b

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RENSSELAER POLYTECHNIC INSTITUTE, TROY, N. Y. The Forty-first Annual Session of this well-known School of Engineering and Natural Science, will commence Sept. 14th, 1864. The Principal Building is completed and ready for occupation. The New Annual Register, giving full information, may be obtained at Appleton's Bookstore, New York, or from Prof. CHARLES DROWNE, Director, Troy, N. Y. 6 8*

GROVER & BAKER'S HIGHEST PREMIUM ELASTIC Stitch Sewing Machines, 495 Broadway, New York. 1 tf

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THE SEVENTEENTH ANNUAL EXHIBITION OF the Maryland Institute of Baltimore, for the promotion of the Mechanic's Arts, will commence Monday evening, Oct. 3d, and continue to Monday evening, Oct. 31st, 1864. The Hall will be open for the reception of goods on Monday, Sept. 26th. Goods for competition and premium must be deposited before Thursday night, Sept. 29th. Circulars, embracing details, may be had of the Actuary at the Institute. Communications addressed to the undersigned, or to WM. C. CORNTHWAITE, Actuary, will be promptly attended to.

3 11* W. W. MAUGHLAN, Chairman Committee on Exhibition.

BRASS PINION WIRE FOR GAS AND WATER Meter-makers made by PETER COLLIE, Clock Maker, No. 1,176 South 11th street, Philadelphia, Pa. Also Indicators for counting the revolutions of Machinery. Electric Telegraph Instruments or any kind of fine brass wheel works made to pattern. 7 7*

ENGINEERING, CIVIL AND MILITARY; CHEMISTRY, Metallurgy, Assaying, &c., at Union College, Schenectady, N. Y. For Circular address Registrar. 24 1y*

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Guaranteed to effect a great saving in fuel and give the most perfect regularity of power. For sale by the subscribers, who have established their exclusive right to manufacture damper regulators, using diaphragms of flexible vessels of any kind. CLARK'S PATENT STEAM AND FIRE REGULATOR COMPANY, No. 5 Park Place, New York 3 26*

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IRON PLANERS, ENGINE LATHES, DRILLS AND other machinists' tools, of superior quality, on hand and finishing, for sale low. For description and price address NEW HAVEN MANUFACTURING COMPANY, New Haven, Conn. 1tf

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HOLSKE & KNEELAND, MODEL MAKERS. PATENT Office Models, Working Models, and Experimental Machinery, made to order at 100 Walker street, between Center and Elm. New York. Refer to Munn & Co., SCIENTIFIC AMERICAN Office. 1tf

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MANUFACTURERS OF STEAM ENGINES, WITH the link motion, variable cut off of the most approved construction; also Lathes, Mill-gearing, Shafting, Hangers and Machinery in general. Address M. & T. SAULT, New Haven, Conn. 19 26*

AN INTEREST IN A VALUABLE INVENTION FOR sale.—Major SMITH'S Improved Cannon-sight. A line shot can be had on first trial. Model to be seen in this office. Patented in 1863. 10 tf

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PATENTED WOOD BENDERS. — THOROUGHLY tested, and unequalled for bending all kinds of Timbers for Carriages, Furniture, Vessels, and Agricultural Implements. JOHN C. MORRIS, No. 122 East 2d street, Cincinnati, Ohio. 10 10*

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A MESSIEURS LES INVENTEURS.—AVIS IMPORTANT Les inventeurs non familiers avec la langue Anglaise, et qui préféreraient nous communiquer leurs inventions en Français, peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront regues en confidence. MUNN & CO.,
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The publishers of the SCIENTIFIC AMERICAN have just prepared, with much care, a pamphlet of information about Patents and the Patent Laws, which ought to be in the hands of every inventor and patentee, and also of manufacturers who use patented inventions. The character of this useful work will be better understood after reading the following synopsis of its contents:—

The complete Patent Law Amendment Act of 1861—Practical Instructions to Inventors, how to obtain Letters Patent, also about Models—Designs—Caveats—Trade-marks—Assignments—Revenue Tax—Extensions—Interferences—Infringements—Appeals—Re-issues of Defective Patents—Validity of Patents—Abandonment of Inventions—Best Mode of Introducing them——Importance of the Specification—Who are entitled to Patents—What will prevent the granting of a Patent—Patents in Canada and European Patents—Schedule of Patent Fees; also a variety of miscellaneous items on patent law questions.

It has been the design of the publishers to not only furnish, in convenient form for preservation, a synopsis of the PATENT LAW and PRACTICE, but to answer a great variety of questions which have been put to them from time to time during their practice of upwards of *seventeen years*, which replies are not accessible in any other form. The publishers will promptly forward the pamphlet by mail, on receipt of six cents in postage stamps.

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WANTED.—A SECOND-HAND BOGARDUS MILL, large size, for dry substances. Address Box 478, Post-office, Philadelphia. 11 3*

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RATCHET DRILLS.—AN IMPROVED TOOL, PATented August, 1863. Manufactured by CHARLES MERRILL & SONS, 556 Grand street, New York.

Sizes—8 and 10 inch, 12 inch, 15 inch, 20 inch, 24 inch in handles.
Prices— $7 50, $8, $12, $17, $22.

Boiler Ratchets to work in 3-inch space, 10-inch handle, $7 50, 12-inch handle, $10 50. The Tool Socket, Rachet, and Feed-screw, are forged solid and hardened. The working parts are simple, durable, and easily replaced, and being within the case are protected from dirt or injury. Can be had of all the principal dealers in tools and machinery. 1*

ARMY SUPPLIES.

OFFICE OF ARMY CLOTHING AND EQUIPAGE,
No. 502 Broadway, New York, Sept. 15th, 1864.

SEALED PROPOSALS WILL BE RECEIVED AT this office until 12 o'clock M., on Thursday the 22d instant, for furnishing by contract, at the Depot of Army Clothing and Equipage in this city,—

Pick Axes, Army Standard.
Petroleum Paper.
Common Tent Pins.
Wall Tent Poles, sets.
Hospital Tent Poles, sets.

Samples of which can be seen at this office. Bidders will state the quantity they wish to furnish, and how soon they can complete the delivery of the quantity they bid for.

Proposals will also be received at the same time and place for coopering packing boxes, the contractor to furnish hoops, nails, etc., and be prepared to cooper any and all boxes at the shortest notice. The bids will state the number of boxes that can be coopered per day, and at what price per box.

A proper guaranty must accompany all proposals, setting forth that if a contract is awarded to the party named therein he or they will at once give bonds for faithful performance of a contract.

The United States reserves the right to reject any part or the whole of the bids as may be deemed for the interests of the service.

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AGENTS WANTED TO SELL THE CELEBRATED Franklin Sewing Machine, on a salary or liberal commission. For valuable particulars, address Box 302, Boston, Mass. 9 10*

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CAVALRY BUREAU, OFFICE OF ASSIST. QUARTERMASTER,
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I WILL PURCHASE IN OPEN MARKET ALL THE Calvary Horses that may be presented and pass inspection at the Government Stables, corner of 10th avenue and 25th street, in this city, until further notice.

Payment will be made in checks payable in certificates of indebtedness, when seven (7) or more horses are received. Price, one hundred and sixty dollars each.

6 tf GEO. A. BROWNING, Capt. and Assist. Qr. Mr.

THE RIGHT TO MANUFACTURE THE ST. CLAIR Harvester and my Patent Grain Drill, can be had on easy terms. W. P. PENN, Belleville, Ill. 7 6*

DEPOT FOR NEW INVENTIONS IN CABINET Making.—Agencies taken for inventions adapted to Cabinet Making, by SMITH & BUTLER, No. 449 Broome street, New York, Manufacturers of Furniture Bronzes, French Moldings, Nameplates, &c. 10 3*

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Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, herausgegeben, und verabfolgen solche gratis an dieselben.

Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu addressiren an

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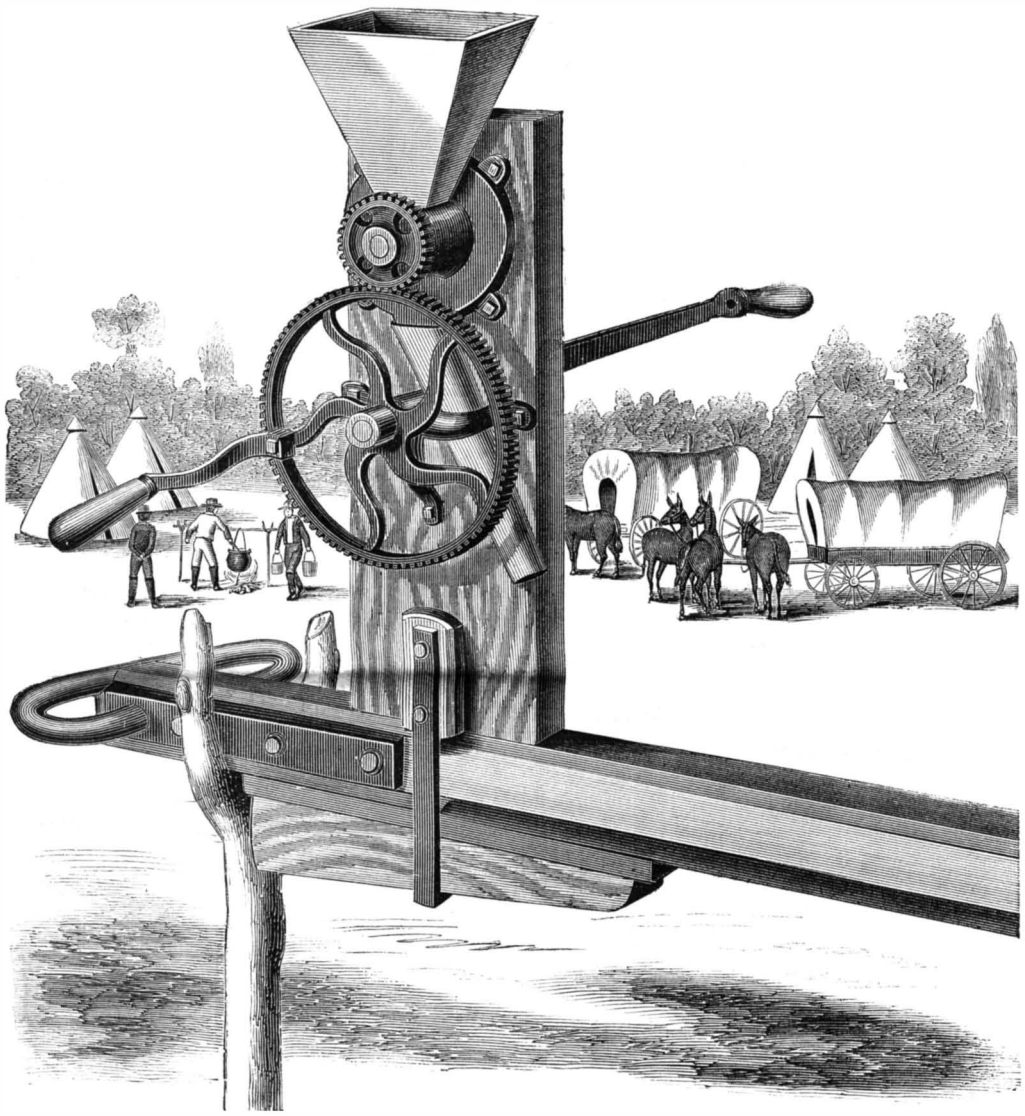
Army and Emigrant Mill.

Mr. Joseph Sedgebeer, of Painesville, Ohio, has devised a new system for the teeth or cutting surfaces of grinding mills, which is novel and does good work. On page 216, Vol. X., SCIENTIFIC AMERICAN, we illustrated and described a grist mill on this principle, showing also the grinding plates. As we cannot republish engravings that have already appeared in the SCIENTIFIC AMERICAN, we refer our readers to the place designated for a view of the plates. We extract a portion of our article relating to the peculiar construction of these plates:—

"The teeth are all formed in shape like the letter Y, the lower part of each tooth in its row commencing with the upper part of the next below, and so on through the whole series in each radiating row of teeth, the extreme point of each arm of every tooth alternating in its circle with those in the next row in the next circle. By this arrangement and the shape of the teeth the pulverized stuff is forced, as well as ground, toward the periphery or discharging edges, and this occurs whether the motion is fast or slow, the mill grinding faster as the motion is increased. The teeth being all raised up over an eighth of an inch from the plane of the plates, gives exceeding durability to the mill, which grinds freer as the teeth become worn, so that by reversing the motion the teeth are sharpened—one side of all the teeth are continually sharpening while the others are becoming dull."

In the mill herewith illustrated the plates are of the same construction, and it is intended for use on farms, plantations or for new settlements where no grist mills are set up. The mill, in its present form, is quickly attached to any wagon, in the manner shown, and is also useful in camp. By removing the gearing and putting the cranks on the shaft the small pinion is on, a child can grind corn or any other substance with it. For grinding corn meal it is very convenient, for this article spoils by keeping, and if a quantity be stored in bulk, as in bags or boxes, it heats and sours, or becomes bitter. With this mill a small or large quantity can be ground at once with great facility. This mill runs either way and is therefore self-sharpening, as one side is whetted while the other wears.

This invention was patented through the Scientific American Patent Agency on the 8th of July, 1862, by Joseph Sedgebeer, of Painesville, Ohio. State rights for sale. Address the inventor as above.



SEDGEBEER'S ARMY AND EMIGRANT MILL.

A New Application of Steam Power.

There has lately been manufactured at the works of Messrs. Worsdell, engineers, of Birmingham, a new engine under the name of a steam road roller. The machine, which has been patented by Messrs. Clark and Batho, is the invention of the latter gentleman, now of Birmingham, and has been ordered by the chief engineer to the Justices of the Peace for Calcutta. To accurately describe the appearance of the machine without the aid of drawings would be extremely difficult; suffice it to say that it is a ponderous machine, the main body having the appearance of a square wrought iron chamber, about 9 feet square and 8 feet deep, with a boiler in the center, attached to which, on a semi-circular foot-board in the front, is placed the engine. Its weight, when filled with water and fuel, is about eighteen tuns. The machine is supported on three wheels, and one of the peculiarities consists in the fact that the wheels can be so regulated as to form a solid roller of the entire breadth of the machine, 9 feet. The hind wheels are each formed of two sections, and there is an arrangement so that when the machine is not required to be used as a roller, one of the sections of each wheel can be raised by means of an eccentric placed on the axle, and thus allow the vehicle to pass along without the friction which would result from the pressing of the entire rollers on the ground. The same arrangement is also adopted with respect to the leading and guiding wheel, which is formed of three sections, two of which can also be raised. The first set of wheels are supported on a framework somewhat resembling a turntable, and the weight is received on a number of anti-friction rollers, which also receive the lateral pressure. The engine is intended to be used in making roads in India, the natives having great objection to the rough macademized roads until they are worn comparatively smooth, which it is anticipated may be done by this machine in a few days. The machine has been tried in Birmingham, and gave general satisfaction.—*London Engineer.*

COLORING MATTER OF THE EMERALD.—A letter from M. M. Wohler and G. Rose to the French Academy of Sciences states that they had been making experiments on the coloring matter of the emerald. Lewy, in 1858, asserted that this coloring matter was organic and was destroyed by heat—a result which the authors of this letter could not confirm. They kept an emerald at the temperature of melted copper for an hour, and found that, although the stone became opaque, the color was not affected. They fused however, some colorless glass with an exceedingly small quantity of oxide of chromium, and produced a color exactly like that of the emerald. They therefore considered this substance the coloring agent, without however, denying the presence of some organic matter.

THE

Scientific American,

FOR 1864!

VOLUME ELEVEN,

NEW SERIES.

The publishers of the SCIENTIFIC AMERICAN respectfully give notice that the Eleventh Volume (New Series) commenced on July 2d, 1864. This journal was established in 1845, and is undoubtedly the most widely circulated and influential publication of the kind in the world. In commencing the new volume the publishers desire to call special attention to its claims as

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Canadian subscribers will please to remit 25 cents extra on each year's subscription to pre-pay postage.

Munn & Co., Publishers,

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FROM THE STEAM PRESS OF JOHN A. GRAY & GREEN.

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